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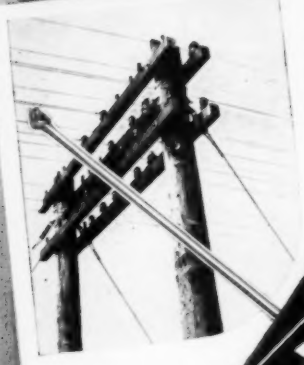

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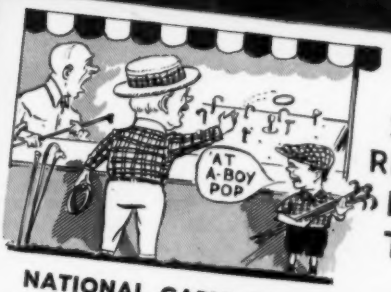

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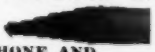

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Uses of Electronic Devices

As Electric Circuit Elements

By ARTHUR L. ALBERT
Professor of Communication Engineering, Oregon State College

***FOURTH OF A SERIES** of articles on electronics and electronic devices used in telephone work. The first one, published February 11, presented basic vacuum tube principles; the second in the March 4 issue discussed the application of vacuum tube principles to thermionic diodes and triodes, and the third article, covering multi-electrode tubes or tetrodes and pentodes, appeared in the March 25 issue*

IN THE preceding articles of this series, vacuum tubes were considered as electronic devices; little was said regarding their practical uses as electric circuit elements. In the following articles, electronic devices will largely be discussed as they are used in practice for such purposes as rectification, amplification, modulation, and demodulation. This article will, accordingly, consider the theory of rectification and the uses of vacuum tubes and copper-oxide disks for this purpose.

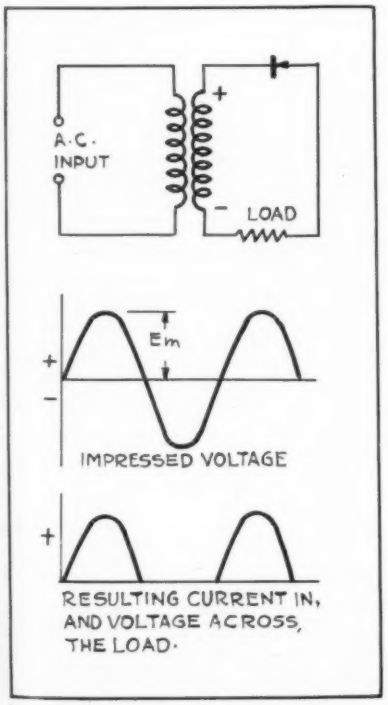

Fig. 1. A half-wave rectifier.

Reliability of equipment and continuity of service have always been outstanding characteristics of the telephone industry. Partly to achieve these ends, batteries have been used almost exclusively for sources of direct current in telephone plants.

With increased reliability of commercial power systems, and better vacuum-tube equipment, has come an increasing tendency to operate certain telephone apparatus from 110-volt, 60-cycle sources. Rectifiers are, of course, necessary to convert the alternating-current power to direct current for operating such apparatus. These rectifiers are easily built, are fairly economical, and are very reliable if assembled from good parts.

Although much design information exists, there still remains much misunderstanding regarding the process of rectification and of the associated filtering usually necessary. It is the purpose of this article to explain certain of the theoretical phases of rectification and the associated filtering, with the hope that such an explanation will be of assistance in rendering the available design information more meaningful.

Types of Rectifier Circuits

Two basic types of rectifier circuits will be discussed in the following paragraphs; others will be considered in later sections. The rectifying elements shown in the circuits now to be discussed are ideal units, having *zero* resistance to current flow in the conducting direction, and *infinite* resistance in the non-conducting or blocking direction.

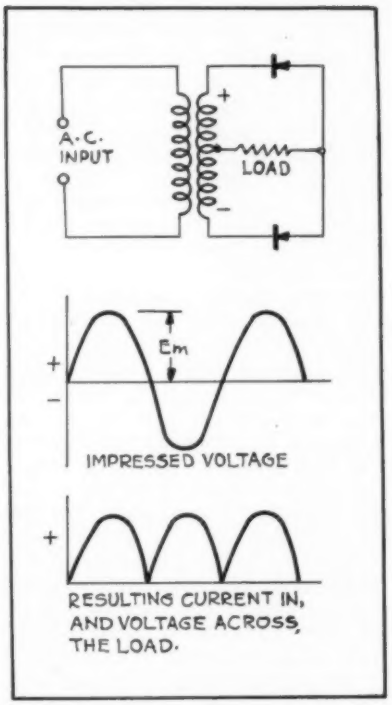

Fig. 2. A full-wave rectifier.

A *half-wave* rectifier is shown in Fig. 1. Assume that during the positive half-cycle the upper end of the transformer is positive and the lower end is negative as indicated, and that for these polarities current flows through the rectifying element. For the negative half-cycle of the impressed alternating wave the polarities will be reversed and no current will flow. Thus, with an impressed sine wave of voltage, a half-wave rectified or unidirectional current will flow through the load as Fig. 1 indicates.

A full-wave rectifier, also using ideal rectifying elements, is shown in Fig. 2. With this circuit, during the half-cycle of the applied alternating voltage that the upper end of the transformer is positive, current

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flows through the upper element. During the next half-cycle, the lower end of the transformer is positive, and current flows through the lower element. The result is the full-wave rectified current shown in Fig. 2.

Analysis of Rectified Waves

The explanations given thus far have been quite conventional and are generally understood. But from now on the popular conceptions of the process, especially of the action of the rectifier filter, leave much to be desired. The somewhat brief and elementary discussion to be given is not new at all; it merely has been given little attention and is accordingly not very widely understood.

From a fundamental standpoint the term "rectification," as widely used, is misleading. Rectification implies that as a result of the process a current is produced which flows only in one direction. It is popularly thought of as a pulsating direct current. Now all this *is* strictly true; but to really understand rectification, the analysis must go farther than this.

Thus, suppose that no voltage drop occurs during conduction in the ideal rectifying element, or in the secondary of the transformer, and that the maximum value of the voltage impressed on the rectifying element is E_m as Fig. 1 indicates. Now suppose that an ordinary direct-current voltmeter is connected across the load resistor. For Fig. 1, a direct voltage of E_m/π will be indicated by the voltmeter, and this is the *direct-current component* of the rectified wave.

Also, let the analysis of this wave be continued, but now using a wave analyzer which will give both the magnitude and the frequency of any alternating-current components that might be present in the so-called rectified wave.

As the voltage across the load of the half-wave rectifier of Fig. 1 is explored, alternating-current components will be found to exist (in what has been regarded merely as a pulsating rectified direct current). And it will be found, furthermore, that these are quite strong components as well.

Still referring to Fig. 1 in which E_m is the maximum voltage impressed on the ideal half-wave rectifying circuit, the first alternating component will be found to have a magnitude of $E_m/2$, and a frequency equal to that of the impressed voltage. Notice in particular, that the magnitude of this alternating-current component is *even larger* than that of the direct current component previously measured with a voltmeter.

A further analysis will show a second component of magnitude $2E_m/3\pi$ and a frequency twice that of the impressed voltage. A third component of magnitude $2E_m/15\pi$ and a frequency four times the impressed voltage will be found, and a further analysis will show other frequencies present. Thus, the mathematical expression for the rectified wave of Fig. 1 is

$$e = (E_m/\pi) + (E_m/2)\sin\theta - (2E_m/3\pi)\cos 2\theta - (2E_m/15\pi)\cos 4\theta\text{—etc.} \quad (1)$$

It may seem impossible that this direct and these alternating-current components will combine and give the so-called pulsating direct-current wave of Fig. 1, but they do it nevertheless.

A similar analysis of the output of the full-wave rectifier of Fig. 2 will show a direct component of $2E_m/\pi$. The first alternating component will have a magnitude of $2E_m/3\pi$, and a frequency *twice* that of the voltage wave impressed across the rectifier. The second alternating component will have a frequency of $2E_m/15\pi$, and a frequency four times that of the impressed voltage; also, other components will be found to exist. Expressed mathematically, the output of the ideal full-wave rectifier is

$$e = (2E_m/\pi) - (2E_m/3\pi)\cos 2\theta - (2E_m/15\pi)\cos 4\theta\ldots\text{etc.} \quad (2)$$

Here again, it is found that the full wave rectifier of Fig. 2 has an output that must be regarded as more than merely a pulsating direct current. It actually consists of a direct current component and various alternating current values which are so related in magnitude and phase that they combine to give the pulsating direct-current wave of Fig. 2.

The purpose of the filter is of course to suppress these alternating-current components, and to let only the direct-current component reach the load. Such a filter and load are shown in Fig. 3, connected to a full-wave rectifier. This filter is of the so-called *choke input* type, because the tubes feed directly into the inductance or choke coil L_1. This is an important point and should be kept in mind when reading the following paragraphs.

Those familiar with filters will at once recognize the filter of Fig. 3 as a low-pass filter, and so it is. It may be assumed, therefore, that ordinary filter theory should be used in its design. Such a solution can, no doubt, be made, but it is not at all necessary, since a more simple treatment is satisfactory for most work.

In this connection it should be stated that the usual low-pass filter in telephone circuits is designed to pass alternating currents up to a given frequency, and then to sharply cut off. The rectifier filter is designed to pass *only* direct current, however, and to suppress all alternating current.

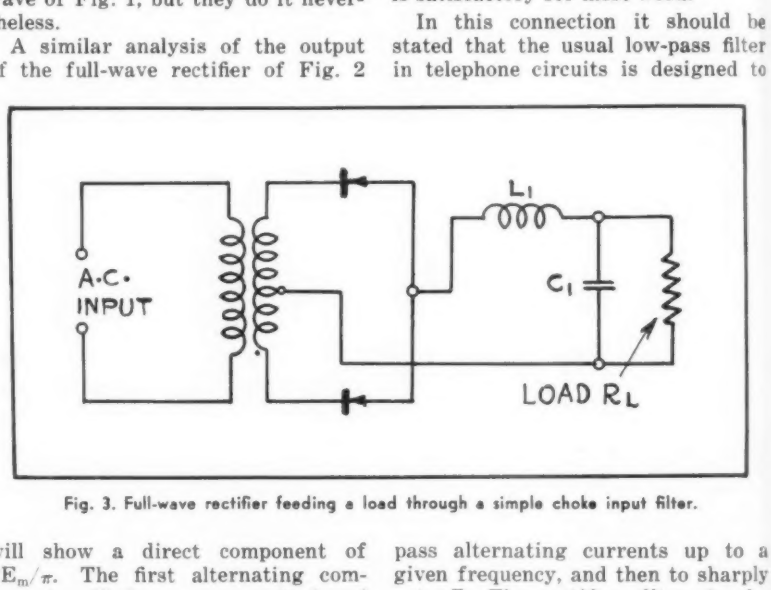


Fig. 3. Full-wave rectifier feeding a load through a simple choke input filter.

The filter of Fig. 3 consists of only one choke, and one condenser, and may not give sufficient filtering action for some work. In such instances a filter such as Fig. 4 would probably be used. It is now possible to discuss some of the theoretical factors entering into the design of filters, remembering that complete design information and curves are available as discussed earlier in this article.

Assuming that the rectifier and the input transformer have negligible resistance (an assumption usually made), the direct current which will flow through the load will equal the direct voltage component of equation 2 divided by the direct-current resistance of coil L_1 (or L_1 plus L_2 for Fig. 4) plus the load resistance.

Since the load resistance is usually high for filters for vacuum-tube amplifiers and similar equipment, the further assumption is often made that the direct current flow is resisted only by the load, and that the total direct-voltage component of equation 2 (or equation 1 for the half-wave rectifier) exists across the load. If all these assumptions cannot be made, then the voltage drops in the transformer, tubes, and chokes must be considered.

Thus far only the direct current has been considered, and attention will now be given to the alternating-current components. Here again, many assumptions will be made to simplify the treatment. In many instances these assumptions are valid.

Referring to Fig. 3, suppose that the impedance of the secondary of the input transformer and the internal impedance of the rectifier element are negligible, and that the resistance of coil L_1 need not be considered. The circuit, from an alternating-current standpoint, becomes Fig. 5 in which the generator shown is impressing the alternating components of equation 2 (or equation 1 for the half-wave rectifier) on the circuit.

Knowing the magnitude of the impressed alternating components, and the values of L_1, C_1, and the load R_L, the magnitude of the alternating voltage across, or the alternating current through the load R_L can be calculated from ordinary circuit theory. Here again, approximations can be used to advantage. Thus suppose that L_1 is a choke coil rated at 12 henries, 231 ohms direct-current resistance, and 130 milliamperes carrying capacity; that C_1 is an 8 microfarad condenser, and that R_L is 10,000 ohms. Let an approximate analysis now be made.

For a 60-cycle, full-wave rectifier, the first alternating component will be 120 cycles. The reactance offered by the 12-henry choke will be about 9,000 ohms at this frequency. Now the value of 231 ohms was the direct-current resistance, and the losses and hence the resistance offered the alternating-currents will be different. Even if this is true, the resistance can usually be neglected. The reactance which the 8 microfarad condenser offers to a 120-cycle current is about 165 ohms.

Thus it is possible to say that the magnitude of the 120-cycle current flowing through L_1 is approximately equal to the voltage as given by equation 2 divided by the reactance of L_1.

The next assumption is that this current all flows through C_1 and that the alternating voltage across the load resistor R_L is equal to this current multiplied by the reactance of C_1. Usually, but not always, no calculations are necessary for other than the first alternating component.

For the more elaborate filter of Fig. 4, the effectiveness in suppressing the alternating components can be calculated by an extension of this same theory. Thus, current which flows through L_2 may be assumed to be the alternating voltage across C_1 divided by the reactance of L_2, and the alternating voltage finally reaching the load will be this current times the reactance of C_2.

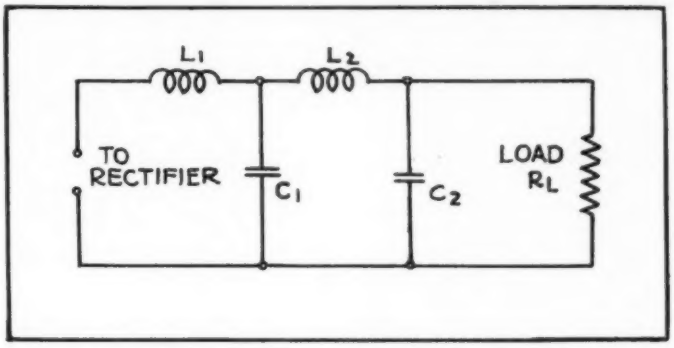


Fig. 4. Filter with additional units for giving more complete filtering than obtainable with the circuit of Fig. 3.

Approximate Filter Equations

Using the reasoning of the preceding section, it is possible to derive equations which give the effectiveness of filters in reducing the alternating current. Thus, for the simple filter of Fig. 3, the current which flows through L_1 is $E_{ac}/2\pi fL_1$, and the voltage across the load is this current multiplied by the reactance of the condenser, or

$$E'_{ac} = E_{ac}/(2\pi fL)(2\pi fC) \text{ or}$$

$$E'_{ac}/E_{ac} = 1/\omega^2 L_1 C_1, \ldots\ldots (3)$$

where $\omega = 2\pi f$, and f is the frequency of the alternating component to be suppressed.

This equation gives the effectiveness of the simple filter of Fig. 3 because it gives the approximate ratio of the alternating voltage E'_{ac} across the load to that in the output from the rectifier, E_{ac}. This ratio multiplied by 100 gives the per cent of the alternating current which will exist across the load.

By a similar method, an approximate equation for the filter of Fig. 4 proves to be

$$E'_{ac}/E_{ac} = 1/(\omega^4 L_1 L_2 C_1 C_2), \ldots (4)$$

where the values of E'_{ac} and E_{ac} and ω have the same meaning as before.

The effectiveness of a filter is often expressed in terms of the per cent ripple in the current or voltage at the load. Equations 3 and 4 *do not* give the per cent ripple. The per cent ripple is defined (by the standards of the Institute of Radio Engineers) substantially as the ratio of the effective value of the alternating ripple voltage at the load to the direct-current voltage at the load.

Thus for the full-wave rectifiers and filters of Figs. 3 and 4 *using choke* inputs—assuming that the direct voltage all reaches the load, and using the same approximations as before for the alternating component—approximate equations can also be written for the per cent ripple. For Fig. 3 the direct voltage across the load will be $2E_m/\pi$, and the effective value of the alternating voltage of the first frequency component will be $2E_m 0.707/3\pi\omega^2 L_1 C_1$. Then, according to the definition of the preceding paragraph the per cent ripple is the ratio of these values, or

$$\text{Per cent ripple} = 0.236/\omega^2 L_1 C_1 \ldots (5)$$

A similar expression can readily be written for the filter of Fig. 4.

Comparison of Choke Input and Condenser Input Filters

As has been stressed throughout this article, the explanations have been given for the choke input instead of condenser input filters. Also, for brevity, and since they are more common, full-wave rectifiers have largely been considered.

Choke input condensers are widely used, and ordinarily must be used with gas rectifier tubes because if a gas tube is worked into a filter with condenser input, the high peak charging current which the condenser draws may exceed the allowable current for the tube. There is still another reason, however, why choke inputs were considered, and this will now be discussed.

As is known to those familiar with

rectifiers, and as is indicated in tube manuals and articles on design, for comparable conditions the condenser input filter will give a higher direct voltage across the load than will a choke input filter. Of course, this may be a decided advantage in some instances.

The reason for this has been fully explained in an article by Stout entitled "Analysis of Rectifier Filter Circuits" and published in Electrical Engineering for September, 1935. This is one of the only articles fully and correctly explaining rectifier action, and the reader is referred to it for complete information.

Very briefly, the presence of the condenser (assuming it is sufficiently large to fulfil certain requirements) causes the output of a full-wave rectifier not to be of the shape shown in Fig. 2, but to be as shown in Fig. 6. Thus, for the filter with condenser input (again assuming that the condenser fulfils certain requirements), there is a larger average or direct-current value for a given maximum voltage; and this means that the direct voltage output is greater, as was previously said to be true for the condenser input arrangement.

It is important to note that equations 1 and 2 and all other relations based on these will *not* be numerically true for condenser input filters with voltages such as Fig. 6. No equation is available which will fully and simply express this voltage for all circuits, because the exact shape is such a variable, depending as it does on circuit conditions.

Of course, the same may be said of the *dotted* wave of Fig. 6, but the deviation from the theoretical is to a much less degree. Nevertheless, it should be possible to write simple relations, such as given by equations 3 and 4, for the approximate effectiveness of condenser input filters.

Rectifying Devices

In the preceding illustrations a generalized symbol has been used to indicate the rectifying device. This may be either a high-vacuum or gas tube, a stack of copper-oxide disks, or some other rectifying element. Although in the discussions, the effects of the tubes on the rectifier and filter operation have been largely neglected, these characteristics, as explained in the second article of this series (TELEPHONY of March 4), will have some effect.

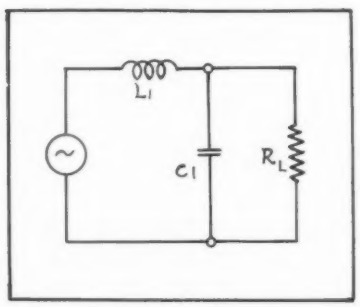


Fig. 5. Simplified circuit of Fig. 3.

If vacuum tubes are used, then in Figs. 1, 2, and 3, the heavy line will represent the plate and the arrow head the filament. Since *electrons* flow from filament to plate, and the *conventional* direction is opposite to this flow, in Figs. 1 and 2 the *right* terminal connected to the load (or to a battery for charging) will be positive, and the *left* will be negative; in Fig. 3, the *upper* end will be positive and the *lower* end will be negative.

The copper-oxide rectifier unit consists of stacks of copper disks on which has been formed a layer of cuprous oxide. The characteristics of such disks will be shown in a future article of this series.

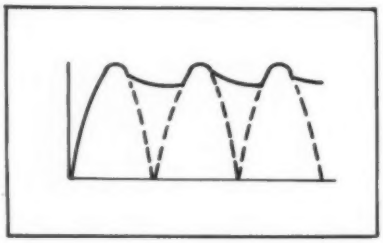


Fig. 6. Full lines show the voltage output wave of a rectifier connected to a filter with condenser input. Dotted lines show voltage wave with choke input.

In these disks (conventional), current flows easier from the copper-oxide layer to the copper, and hence they act as rectifier units. Although they are often used in any of the circuits shown, they are commonly used in the bridge circuit of Fig. 7. Their use as rectifiers is discussed by Huss in an article "An Analysis of Copper-Oxide Rectifier Circuits," Electrical Engineering, March, 1937.

Summary

Although vacuum tubes were first used as rectifiers, strange as it may seem, many vague theories exist regarding the operation of rectifier circuits. When viewed in its true light, the subject is easily understood.

Rectification is a process of distortion. If a pure sine wave voltage is impressed on a rectifier, then a badly-distorted wave will exist across the output circuit. This distorted wave contains the desired direct-current components and several (usually) undesired alternating components. The filter presents these alternating voltage components from sending alternating currents to the load, but readily permits the direct current to flow.

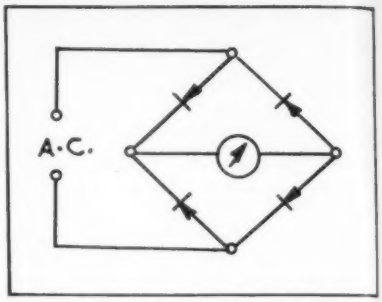


Fig. 7. Copper-oxide rectifier bridge circuit. This is a full-wave rectifier such as is used with copper-oxide A-C measuring instruments. A rectified current flows through the permanent magnet or D-C instrument at the center of the bridge.

Voltage amplifiers will be treated in the following article of this series.

▼ ▼

Telephoneless County in Georgia to Have Service

Dawson county, Georgia, without telephone service for 18 years, soon will have a toll station in the county seat at Dawsonville. Since the Dawsonville exchange burned, the folks around there have been doing their talking from mouth to ear—direct, not via copper wire.

Chairman Walter R. McDonald of the Georgia Public Service Commission said the Southern Bell Telephone & Telegraph Co. planned to install the toll station, in Harben Brothers store, by the middle of July.

E. B. Merry, Georgia manager for the company, told Mr. McDonald that rural line service also would be available in the Silver City and Coal mountain areas of Dawson county. Sparsely-populated, Dawson county is in northeast Georgia.

▼ ▼

Pacific Bell Sues for Recovery of Protested Taxes

The Pacific Telephone & Telegraph Co. on May 23 filed suits against the city of Red Bluff, Calif., and the county of Tehama to recover taxes paid under protest to the defendants.

The complaints asks $433.80 and court costs from the city of Red Bluff and $3,289.65 plus court costs from Tehama county.

In the Nation's Capital

by Francis X. Welch

Special Washington, D. C., Correspondent for TELEPHONY

COMMISSIONER WALKER renamed to FCC for seven-year term. . . . REA Chief Carmody appointed to head new Federal Works Administration. . . . Pertinent comments on FCC's final report on Bell investigation give information on points that will interest Independents

ON THURSDAY, June 22, FCC Commissioner Paul A. Walker reported to the White House for an appointment with President Roosevelt. This was generally accepted as a tip that the President would probably rename Commissioner Walker to succeed himself upon the expiration of his current term on July 1.

Mr. Walker's "candidacy," if one may use that word somewhat inaccurately, was unquestionably helped by the unexpected agreement of the FCC upon the final report on the special telephone investigation. Thus, although this department suggested some months ago the possible retirement of Commissioner Walker, the picture has now changed entirely. He was renominated June 26 for another term of seven years.

There never was any doubt about President Roosevelt's personal friendliness and support for Commissioner Walker's special activity in the field of telephone regulation and investigation. But there has been in the past considerable difference over the investigation in both the Senate and the House, and even within the FCC. This criticism, such as it was, was not directed entirely at Commissioner Walker; but because he stood for the FCC's handling of the telephone investigation more than any other responsible officer, he received the benefit or, more correctly, the brunt of it.

Had the final telephone report blown the FCC into two or more pieces, as had been threatened, Commissioner Walker's position as the master-mind of the investigation would have been compromised—to say nothing of the prestige of the FCC itself, such as it is. Under such circumstances, President Roosevelt might well have thought twice before sending his name for confirmation by a Senate which had been stirred up like a hornet's nest.

But as matters are now, Commissioner Walker stands technically vindicated, with the full commission behind him in one of the few unanimous major actions of its entire history. The underlying fact that such union was obtained by cutting off the tail of Commissioner Walker's report "right behind the ears," is of concern only to students of regulation and the industry affected. Politically, since such sacrifice is not popularly obtrusive, it is quite unimportant.

And so the administration should have little real trouble in obtaining confirmation of Mr. Walker. Some discussion may occur on the floor, but a record vote is quite remote.

Even in the House of Representatives, where anti-FCC sentiment is more pronounced than in the upper chamber, the commission critics seem to have lost interest in the telephone investigation. This was seen in the brief and perfunctory hearings held early last week by the House subcommittee on the 11th-hour 1940 appropriation for the FCC.

More anti-FCC friction may break out on the floor when the appropriation measure comes up, and there is still a good chance that the FCC critics will seek other chances to have their innings, especially in view of the recent FCC bungling of the international broadcast restrictions.

But criticism of the FCC on grounds of the special telephone investigation has vanished, for the seemingly obvious reason that there isn't much left to fight about. Already Washington wags are referring to this recently-completed investigation as something that "came in like a lion and went out like a lamb."

SPEAKING of new appointments, your correspondent can point to a little better showing (than was made in this department with respect to Commissioner Walker) in the case of REA Chief Carmody, recently named to head the new Federal Works Administration. Readers may recall a prediction that Mr. Carmody would not relish having his independent status being changed to that of an immediate subordinate to a Cabinet officer. Oddly enough, in his new post, Mr. Carmody will be the *boss* of a Cabinet officer.

That means Secretary of the Interior Ickes, who is also head of the Public Works Administration that has been placed under the new agency which Mr. Carmody is to head. However, this is only a technical coincidence, and it is not expected that the administration will permit the continuation of an anomaly whereby a member of the Cabinet in one capacity is made subordinate to the chief of an independent bureau in another capacity.

Secretary Ickes will probably step out as chief of the PWA in the near future.

While it might have been true that the highly-individualistic temperament of Mr. Carmody played a part in the President's decision to find another job for him, it would be unfair to say that he was kicked upstairs because of any official dissatisfaction over his work with the REA.

On the contrary, whatever the private utilities—telephone, as well as electric power and light companies—may think of him, there is little doubt about his ability as an organizer and his energy as an executive. The new Federal Works Agency is just the type of post for Mr. Carmody to continue the splendid official record he made in the eyes of the New Deal as head of REA.

A READER of this department writes in to know just what there is in the final telephone report that would be of special interest to the Independent telephone men. Probably other readers of TELEPHONY may be wondering about the same thing. So here are a few hints:

Of course, the entire report well merits reading and careful analysis by anybody who is seriously interested in the telephone business, whether Bell or Independent. Aside from the general importance of the document, however, probably the most significant single point from the Independent angle was the first recommendation of the full commission that the Communications Act should be amended so as to authorize the FCC

"to prescribe basic cost accounting methods to be followed by manufacturing companies under contract with operating telephone companies for the general supplying of materials or equipment and by manufacturing companies subsidiary to or affiliated with operating telephone companies through corporate structure."

While the discussion in the text of the report plainly indicates that this recommendation is aimed at Western Electric or at a situation in which other manufacturing industrial affiliations with the Bell System are at least partially involved (such as in the case of Graybar), the language quoted, if broadly construed, would include about every Independent telephone manufacturing company in the field which has any dealings at all with "operating companies" under the jurisdiction of the FCC.

Clearly, there would have to be some sort of contractual relationship established between the manufacturing concern and the operating company to carry through any form of commercial relationship, however trivial—even the sale of a single head-piece.

A reading of the text of the report on the affairs of Western Electric does not throw much light on the real intent behind this recommendation. It is safe to say, however, that if, as, and when a bill is introduced in Congress to write this recommendation into the Communications Act, Congress will require that the language be much more specific and definite about which manufacturing companies will come under cost accounting regulation than is indicated in the foregoing quotation.

Executives of Independent operating companies will probably find most interesting that part of the final report which deals with the corporate growth and history of the Bell System. These passages which occur in the first of the two mimeographed volumes of the final report (Chapters 1 to 5), go through the history of the early struggles between the Bell System and the Independent companies, the anti-trust action, which was followed by the Kingsbury commitment, the Willis-Graham Act, and the Hall memorandum.

Both the operating and manufacturing men of the Independent industry will follow with interest, compliments paid in the final report to the progressive spirit of the Independent telephone industry. It was given credit for "accelerating" the distribution and use of the handset telephone. The commission found that the Independent manufacturers led again in the development of the anti-side tones circuits in telephones.

Commenting on the tardiness of the Bell System in bringing out the combined handset with bell box, the report states that this form of subscriber apparatus was made commercially available in America by an Independent manufacturer in 1925, and shortly thereafter by other Independent manufacturers. It was not introduced in the Bell System until 12 years later.

The Independent manufacturing industry was also given credit for leading Western Electric in the development of improved manual switchboard, cordless toll boards, and direct dialing by subscribers over toll lines. In the case of unattended automatic exchanges for rural areas, the report found that two Independent manufacturers had led the Bell System by nearly 15 years. The "director" type of switch, developed by one Independent manufacturer, has not yet been adopted by the Bell System, according to the report.

This comparison of Independent and Bell manufacturing standards was contained in Chapter 9 of the report, entitled "Engineering and Standardization."

FINALLY, there is an interesting reference in Chapter 11 to the position of the Independent operating telephone industry on "Depre-

Best Story of the Week —What's Yours?

They were just two Indiana Bell equipment installers on their way from Anderson to Indianapolis by the interurban but the police didn't know that—and anyway, they had big rolls of tape in their kit bags.

But that's neither here nor there; at least it didn't concern the installers any when they saw a state police car pull away from the barracks near Pendleton and race alongside the interurban toward the city. In fact, their only concern over the whole affair was for the troopers who raced neck and neck with their speeding conveyance for mile after fleeting mile, according to the story as it appeared in the Indiana Telephone News.

"Those guys sure must be tired of livin,'" was the comment of one installer, to which his companion grunted assent. After a while the road and interurban tracks parted company, and the installers dismissed the speeding troopers from their minds.

At the Indianapolis interurban station, however, the troopers again appeared. Boarding the car, which they had beaten to the city, they looked around.

"Everybody keep your seats," one of them ordered.

"There they are," said the other, pointing to the telephone men. "Come along, you two!"

They went. They weren't criminals and they knew it, but neither would have bet very much right then that they weren't. The only thing they knew for certain was that they were a couple of mighty tough hombres—in the eyes of the law, at least.

They didn't feel tough, though.

P.S. Their employe identification cards set them free.

ciation." In one sense this chapter is probably the mystery part of the whole report. The language—especially when compared with the corresponding discussion in Commissioner Walker's Proposed Report—reflects a considerable amount of mixed authorship, revision, and cross-editing.

One reasonable explanation for this mysterious conflict of tone, which sometimes varies from paragraph to paragraph, is pointed out by the alert editor, Roland Davies, of "Telecommunications Reports," a service which has been analyzing the final report in comprehensive detail ever since its release.

He observed that while the Walker report had made out a pretty good case against the accumulation of excessive depreciation reserves, other Federal regulatory agencies—such as the SEC and the FPC—have been continuously stressing the importance of adequate reserves for the public service companies under their respective jurisdictions. He intimated that the full commission is probably afraid of getting out of step with the rest of the parade.

This would explain the discreet and hedging language in the depreciation chapter, which flirts with the straight-line depreciation theory without actually endorsing it.

Coming back to the Independent point of view, the final report states:

"The Independent telephone companies, in recent consideration of the subject of depreciation, have contended that the same factors which caused gross telephone revenues to fall during periods of depression also caused the rate of depreciation to drop, and have emphasized the advantages of rules for depreciation accounting which should be sufficiently flexible to meet the requirements of individual companies.

They interpret the strictly straight-line depreciation theory as requiring that the estimated total depreciation cost of a telephone plant be charged off at the same rate every year. This arises, they say, from the fact that under the straight-line theory when the depreciation for 20 years, as an illustration, is calculated to be a certain amount in dollars and cents, it is required that exactly 1/20th of that amount be charged to operating expenses as the cost of depreciation in each of those 20 years.

The Independent companies have gone on record as disapproving this theory. They claim that depreciation does not occur at the same rate every year; even wear and deterioration are not the same every year, since they depend upon use and the elements, which are not the same every year; and certainly the two important factors of inadequacy and obsolescence are not the same every year, as proved by the depression.

The Independent telephone companies contend that a telephone company which has lost, say, 25 per cent of its telephones and still has its original plant available for serving its patrons, certainly does not need to make the same provision for inadequacy now that it needed to make when its plant was practically filled up and still growing rapidly.

They further claim that experience during the depression has shown that telephone companies in general have at least temporarily arrested the factor of obsolescence by the simple process of deferring indefinitely any retirements of equipment for this cause and retaining the present equipment in service."

It was suggested in this department last week that the next session of Congress might take the specific recommendations of the FCC final report in two bites. By segregating from the less controversial proposals—the plan to regulate Bell securities and the plan to regulate manufacturing accounting—it was believed that the rest of the program would go through without much serious opposition.

This overlooked, however, the probability that the FCC proposal with respect to licensing telephone manufacturing patents is certain to run up against delay if not actual opposition from two other government sources. First of all, the Patent Office will have plenty to say about it and may insist on being given such authority rather than the FCC, if Congress decides to delegate it. There is some merit to the contention that the FCC is not technically equipped to handle patent regulation.

Again, Senator O'Mahoney's Temporary Economic Committee is still threshing out the entire broad field of economic monopoly and competition. This field naturally includes the problem of patent regulation, especially along the lines of social reform suggested in the FCC recommendations. Under the circumstances, it is only logical to expect that Congress will avoid jumping the gun by giving the FCC power over telephone equipment patents before the O'Mahoney committee even has time to report on its general findings.

COMING CONVENTIONS

Michigan Independent Telephone Association, Hotel Olds, Lansing, July 26 and 27.

Kentucky Independent Telephone Association, Brown Hotel, Louisville, October 23 and 24.

Tennessee Independent Telephone Association, Hermitage Hotel, Nashville, October 26 and 27.

▼ ▼

Free Pay Station Calls, Fraudulently Claimed, Reduced

Under an old routine the operators of the Cleveland exchange, of the Ohio Bell Telephone Co., made it a rule to give a free telephone call to a user of a public pay station when he claimed a wrong number or a cut-off. The wrong number or cut-off complaints added up to 2,000 a day in Cleveland.

The officials of the company knew that the grand total of 2,000 was wrong and accordingly they had studies made of the matter. The results of the research showed that only 15 out of every 100 claims for free calls were legitimate. In lost revenue this amounted to $85 a day.

After the results of the study were made known, a method was found for cutting down this loss—and it worked without offending any pay station users. In the new practice, instead of returning the nickel which the customer had used to register his complaint, the operator retains it. She then puts through the telephone call and asks the customer to flash when through talking, for a mail refund. A mail refund means taking the name and address of the subscriber so that the company can return the nickel by mail.

At this point, in the routine, the subscriber claiming a fictitious cut-off or wrong number is loath to give his name and address. If he does give it and his name frequently appears for refunds, a representative from the pay-station department of the company calls on him to find out why he is having so much trouble.

When the new practice was initiated some months ago 75 per cent of the subscribers did not flash the operators back to arrange for their mail refund. This meant a saving of $75 a day for the company. Within a period of 18 weeks claims on free calls had dropped from 2,000 to 400 a day for a decrease of 80 per cent.

Of these present 400 free-call claims a day, apparently 85 are still fraudulent, as the pay-station user does not arrange for a refund. The customer reaction to this practice is very satisfactory. Regardless of the circumstances, no customer is refused a mail refund on a claim.

FATHERS AND SONS

JOE WATTS, SR., manager of the Illinois Commercial Telephone Co., Newton, Ill., has two sons who are employed in the Independent telephone field. **JOE WATTS, JR.,** is troubleman for the Illinois Commercial Telephone Co., at DuQuoin, Ill. The younger son, **CARL H.,** working as repairman, is employed by the same company at its Fairfield exchange.

JOE WATTS, SR., was born at Clay City, Ill., April 8, 1879. After a public school education, he learned the bricklayer's trade and worked at his trade for some years. Early in 1920 he secured employment with the Newton Telephone Co., at Newton, Ill., as troubleman.

The Newton exchange was in turn taken over by the Jasper County Telephone Co., the Standard Telephone Co., and the Illinois Commercial Telephone Co. Thus Mr. Watts changed employers but not his employment; and since 1927 he has served as manager of the exchange.

He is a member of the I. O. O. F. Lodge and the M. E. Church.

JOE WATTS, JR., was born at Newton, Ill., November 14, 1909, and acquired his education in the public grade and high schools of that community. After some experience as a carpenter, he secured employment with the Illinois Commercial Telephone Co. at DuQuoin as troubleman and has continued in that capacity down to the present time.

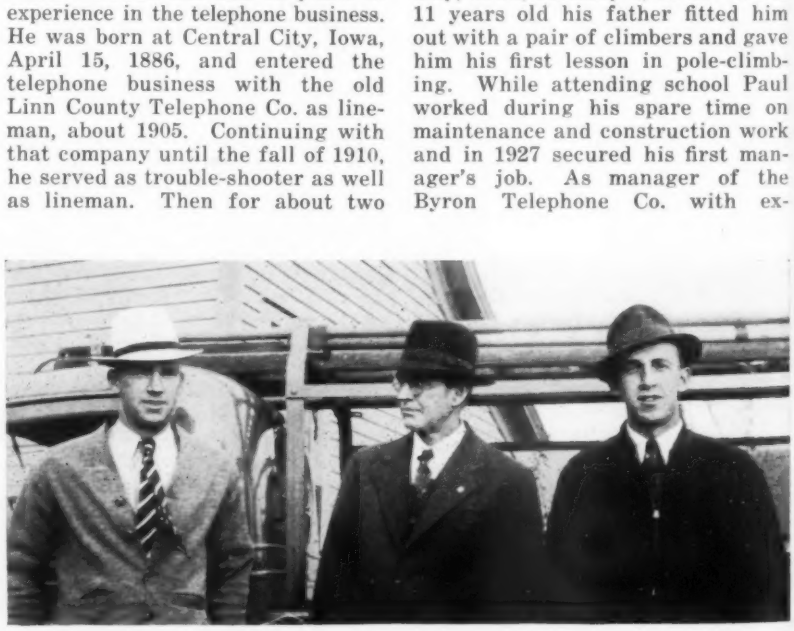
CARL H. WATTS was also born at Newton, Ill., February 15, 1917, marking the date of his birth. He was educated in the local schools of Newton and began work for the Illinois Commercial Telephone Co., March 20, 1936, as a groundman. About six months later he became a student lineman; several months later, a student bookkeeper. Following a few months' experience as timekeeper and some months spent as a student repairman, he became repairman at the Fairfield exchange in June, 1938.

BEN HALL, manager of the Iowa State Telephone Co., at Greene, Iowa, has three sons who have followed him in the telephone business. **PAUL,** the eldest, is manager of the Farmers Mutual Telephone Co. at Rockford, Iowa, with 17 years of telephone experience to his credit. The second son, **LYLE,** although at present in the army and stationed at Ft. Snelling, Minn., has had 15 years of telephone experience. **DWIGHT** is manager of the Ingham Township Mutual Telephone Co. at Dumont, Iowa.

BEN HALL has had 35 years of experience in the telephone business. He was born at Central City, Iowa, April 15, 1886, and entered the telephone business with the old Linn County Telephone Co. as lineman, about 1905. Continuing with that company until the fall of 1910, he served as trouble-shooter as well as lineman. Then for about two years he was employed as line foreman for the Wapsipinicon Power & Light Co. of Cedar Rapids.

From 1912 until the spring of 1921 he was manager for the Wilton Junction Telephone Co., of Wilton Junction. Then he entered a partnership with the late D. C. Phillips, of Grinnell, and Glenn Merritt, of Des Moines, and engaged in the buying and selling of telephone properties. During that period Mr. Hall and his associates purchased the exchange at Belle Plaine, Iowa, and to Mr. Hall was assigned the task of installing a new common battery plant. Since 1928 he has been located at Greene, Iowa, as district manager of the Greene and Aplington exchanges of the Iowa State Telephone Co.

PAUL HALL was born at Central City, Iowa, January 3, 1908. When 11 years old his father fitted him out with a pair of climbers and gave him his first lesson in pole-climbing. While attending school Paul worked during his spare time on maintenance and construction work and in 1927 secured his first manager's job. As manager of the Byron Telephone Co. with ex-



The Watts telephone family: JOE WATTS, JR. (to the left), is troubleman for the Illinois Commercial Telephone Co. at DuQuoin; JOE WATTS, SR. (center), is manager of the Newton exchange; CARL H. WATTS (right), is repairman at Fairfield.

HERE IS THE SEVENTEENTH article in a series introducing tomorrow's potential leaders to one another and to the field in general. Material for this feature will be welcome

in the Independent telephone industry

The Hall family of telephone men. From left to right: DWIGHT HALL, manager at Dumont, Iowa; LYLE, at present with the U. S. army at Ft. Snelling, Minn.; PAUL G., manager at Rockford, Iowa; and BEN, district manager of Iowa State company at Greene.

changes at Byron and Stillman Valley, Ill., he was reported to be the youngest manager in the state, being only 22 years of age.

Since that time he has managed various plants in Illinois and Iowa, being with the Iowa-Illinois Telephone Co. for a number of years and later with the Slater Mutual Telephone Co., at Slater, Iowa. Since July 1, 1938, he has been serving as manager of the Farmers Mutual Telephone Co. at Rockford, Iowa. He is a member of the Independent Pioneer Telephone Association of the United States.

LYLE HALL was born at Coggon, Iowa, April 28, 1909. Starting to climb poles at the age of 14, he worked for his father in Belle Plaine and Greene until he finished school in 1928. Then, after a brief experience with the line gang of the Northwestern Bell Telephone Co., he worked for his father with the Iowa State Telephone Co. until he joined the army in 1937. At present he is stationed at Ft. Snelling, Minn.

DWIGHT HALL was born at Central City, May 10, 1911. He began his apprenticeship by learning to climb at the early age of 12; at that time he and his brothers were acclaimed the "youngest telephone gang on record." From then on until through high school, he worked for his father—with the Central Iowa company at Belle Plaine and later with the Iowa State company at Greene.

He was then employed in the plant department of the Northwestern Bell Telephone Co. at Cedar Rapids. After an interlude of five years, during which time he served in the navy and was employed in Washington, D. C., as a drug clerk, he returned to the telephone field, securing employment in the cable department of the Chesapeake & Potomac Telephone Co. of Virginia.

Returning to Iowa, in 1938, Dwight worked as lineman for the Iowa State Telephone Co., until his recent appointment as manager of the Ingham Township Mutual Telephone Co. at Dumont, Iowa.

PRESENTING a rare but pleasing combination, a grandfather and a grandson in Bricelyn, Minn., are working together in the telephone business. **A. E. WILCOX** and his grandson, **KENNETH A. JOHNSON,** together own and operate the Bricelyn Mutual Telephone Co.

KENNETH A. JOHNSON joined with his grandfather four years ago when the outside work of the telephone business and the local theater owned by Mr. Wilcox were turned over to him. He has been educated in grade and high schools and has received some business college training. He is well prepared to follow in his grandfather's footsteps and carry on the enterprises which Mr. Wilcox started so many years ago.

Throughout the life of A. E. WILCOX, the telephone has played a large and interesting part. He was born on a farm in Norfolk County, Ontario, Canada, and his first contact with the telephone was made when he was 10 years old. At that time his father attended the Centennial Exposition in Philadelphia, where a young inventor by the name of Alexander Graham Bell exhibited, to an unsympathetic audience, his invention — the telephone. Mr. Wilcox heard from his father's lips of the demonstration—but little did he then realize the part the telephone was to play in his own life.

The family later moved to Brantford, Ontario, Canada, where Bell

KENNETH A. JOHNSON operates and owns with his grandfather, A. E. WILCOX, the Bricelyn Mutual Telephone Co., Bricelyn, Minn. Mr. Wilcox is a pioneer in the Independent telephone business and remembers when people "thought it a sin to talk over the telephone on Sunday" except in cases of emergency.

conceived the idea of the telephone and first tried it out by stringing wire between Brantford and Paris, Ontario, Can. Mr. Wilcox went to the grade and high schools at Brantford and later added to his education by attending a business college in Woodstock, Ontario.

Down On or Up On

By ANNE BARNES

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Ia.

A CRITIC IS ONE who is either skilled in judging things, or one who is not. In the latter case, according to the late Will Rogers, such people are very often "*down on* things they are not *up on*."

How careful we should be in passing judgment concerning things of which we are not entirely familiar.

Several years ago I was sent to Hocum to conduct a district conference. Arriving the day before, as it was to be Hocum's initial experience in holding a conference, I thought I would help in any way I could to get ready.

Imagine my consternation when the Hocum operators told me they would not attend the meeting; they did not like their toll center operators because they put their own calls through before they did Hocum's.

I interviewed the toll center's chief operator as soon as she arrived and told her Hocum's story. Admitting that there was lack of harmony between the two offices, she said she wanted to meet the Hocum operators on their own ground and try to determine what was wrong, as neither office could afford to work that way any longer.

She was received very graciously by the Hocum operators. After they had told her about their new board—of which they were so proud—and their many other duties besides operating, she told them she knew it would take her a very long time to learn their work, as she and her operators were specialists in only one thing—operating. They were not required to be bookkeepers, collectors, and housekeepers in their own office.

She also asked if she might come to Hocum now and then and learn to operate their new board. They told her they would be delighted to have her do so. She did, and a fine friendship was built up between the two offices. Its foundation was *understanding*.

Later, the Hocum operators visited the Crystal City office and they were also treated very courteously. When they saw how calls were handled in order of precedence, regardless of where they originated, they realized they could not be handled in any other way. So the misunderstanding was all ironed out when both groups were *up on* each other's responsibilities.

The moral of my story is, of course, the Crystal City operators and the Hocum operators were no longer *down on* each other's performance because they were *up on* each other's performance.

In 1885 he went west to Dayton, Ohio, where he learned telegraphy and for some years worked at railroading. He also farmed for several years. In 1899, following the trend of the railroads to develop the north and the northwest, Mr. Wilcox went to the newly-established town of Bricelyn, Minn., where he purchased the second lot to be auctioned off and moved his family from Mankato in 1900.

In 1902 the inconvenience of not having some form of communicating system in the town caused the merchants to call a meeting and form a telephone company, each subscribing $25. Mr. Wilcox attended the meeting and was elected secretary of the new organization. Later he purchased the local organization for $500, plus an agreement to serve the original stockholders for $1.00 a month as long as they lived.

After buying out the company Mr. Wilcox took over the complete operation and until last winter, when he turned things over to his grandson, he cared for all of the reports and the collections.

About the time the company was organized the local farmers also became infected with the telephone fever and as a result 12 or 15 small companies were formed. The Bricelyn company met them at the village limits and started out by charging $1.50 a year for switching service. At the present time the farmers are still the owners of their lines "but the yearly charge was forgotten long ago when everyone realized that it could not be done," says Mr. Wilcox.

Mr. Wilcox has been through the usual period of squabbles over rates and has managed to come out with the "live and let live" rate which prevails at the present time. The company has grown from its first small list of subscribers until today it takes three operators to serve the 130 local and 250 farmer subscribers.

Mr. Wilcox has tucked away in his mind many pleasant memories of his many and varied contacts with the telephone industry during the last 37 years. Not many persons can recall the day when it was considered a sin to talk over the telephone on Sunday—but Mr. Wilcox can remember when his exchange stayed open only one hour, from 8 a.m. to 9 a.m., on Sunday.

Down through the years Mr. Wilcox has been active in all civic improvement movements. In the spring of 1937 he induced the village council of his home town to set out some 300 evergreen trees along the north side of the village. He was the first clerk of the school district and helped to supervise the erection of the building in 1902.

For the past 25 or 30 years he has been secretary of the Woodman Lodge and at one time had the honor of having written more juniors than any other secretary in the state. Mr. Wilcox has one son who at the present time is a professor of mathematics at the University of Minnesota.

▼ ▼

"Squalus" Submarine Disaster Increases Telephone Traffic

The tragic sinking of the navy submarine "Squalus" at Portsmouth, N. H. created heavy demands by naval and governmental authorities, newspapermen and individuals which caused a tremendous increase in telephone and telegraph traffic. Under normal conditions about 7,000 words are transmitted daily from Portsmouth, but from the time the "Squalus" went to the bottom of the ocean on May 23 through May 24, between 70,000 and 80,000 words were transmitted by telegraph.

The telephone company also noticed an increase in traffic and it was necessary for the New England Telephone & Telegraph Co. and the American Telephone & Telegraph Co. to install ten extra trunk lines between Portsmouth and New York and eight extra to Boston. It was estimated that telephone calls increased 100 per cent.

Preparation of Technical Publicity

Presents Special Difficulties

By FRED E. EVANS

***TECHNICAL PUBLICITY** must be highly informative, fully descriptive and exact in every detail. Wisdom should be used in issuing too much technical information that may scare away the non-technical customer. Technical advertisements are not advertising "puffs," but are running commentaries on the equipment or product*

WHILE much has been written and said about advertising from the "selling" angle, comparatively little has been said about the problems encountered in the preparation of literature and advertisements describing technical products; and in this respect the telephone and electrical engineering industry presents many special and interesting difficulties.

By this it is not, of course, intended to refer to advertisements and literature prepared for the general public, for they usually have a popular appeal and, whether they sell service or a new type of handset, remain strictly non-technical.

This article, on the contrary, deals with the difficulties encountered in preparing and producing advertising matter which is actually of a technical nature; and this leads to our first problem, for such publicity material must be highly informative, fully descriptive, and strictly exact in every detail of description.

Now, a large proportion of the advertisements and literature produced by technical concerns deals with new pieces of apparatus and new developments. The publication of this publicity material must generally be either contemporaneous with the release of the product or must precede it to allow the preliminary "spade-work" of selling to be done.

Therefore the preparation of publicity material, and the development work on the product, must march together for some considerable time before hand. Those who have had experience of this situation—from either viewpoint—are apt to be reminded of the popular "tag" of the old circus acrobats.

FRED E. EVANS discusses the preparation of technical publicity based upon his experience and observations in Great Britain. He points out that the preparation of publicity material and the development work on the product must march together for some considerable time before release.

"Zis treek, gentlemen," they would say, "ees eempossible!"

It is not impossible. But it is very, very difficult. To describe accurately and in detail something which at the time of writing is undergoing progressive development work and is changing, both in idea and in shape from week to week—or to obtain good, telling photographs and "real-life" drawings of something which is not even made—is a hard task.

In this respect one must remember the time which elapses in the actual printing of the publicity material. Sometimes the tendency is to assume that a number of pages of typescript and a set of photographs are placed together in a parcel and sent to the printer. This is very far from being the case.

It is, perhaps, of interest to run through one or two of the principal points which form the actual staff and printing process work in the production of, say, a booklet.

To begin with, every illustration needs a printing block, or cut. This has to be ordered from a block-making firm or engravers who require some time for their work. They also require photographs, which means the attendance of a professional photographer and the attentions of retouching artist, who may often spend several days upon one illustration alone. Multiply this by 30 illustrations!

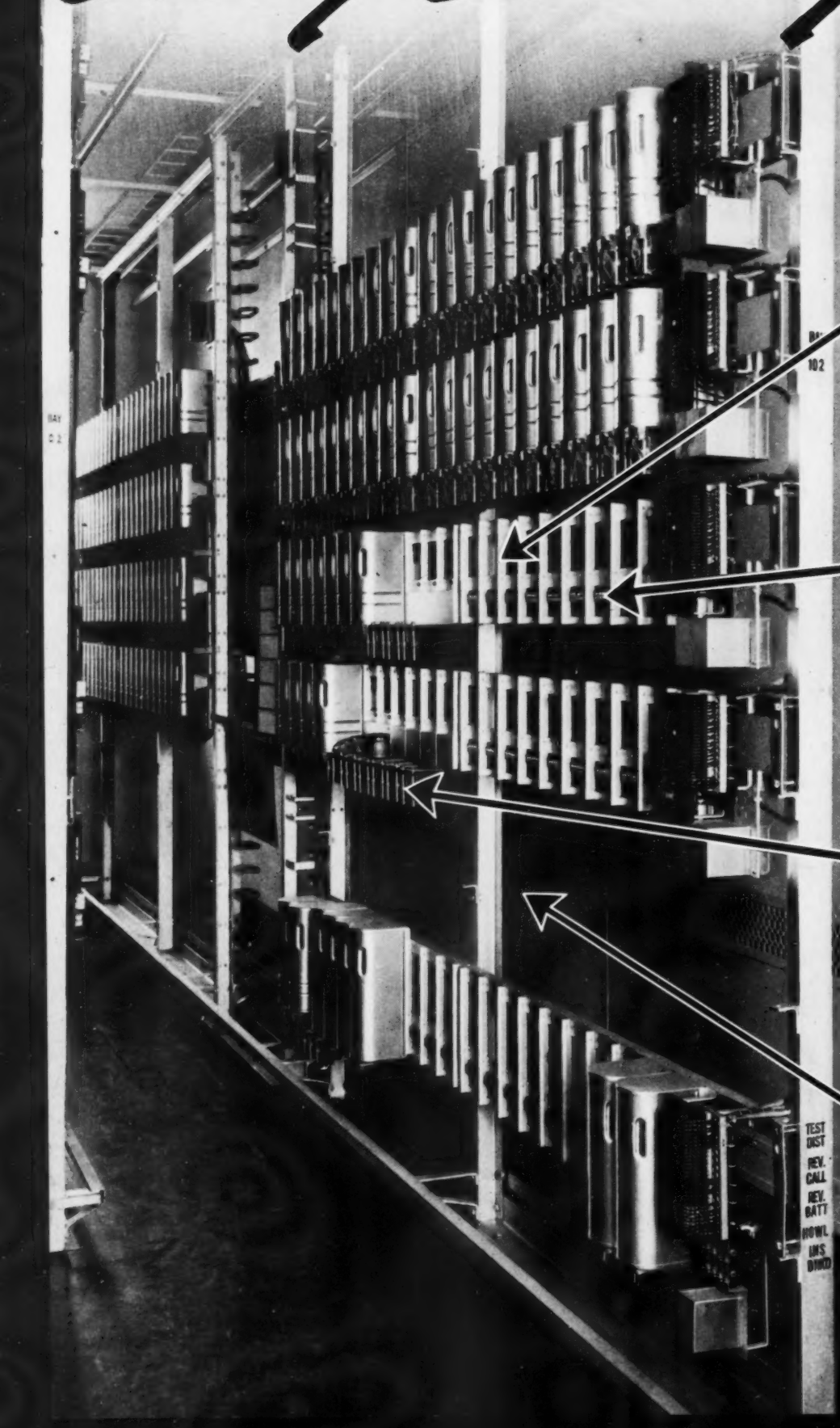
Then there is the question of layout; also the job of the advertising department. This means the translation of every word of the text into a certain number of square inches of printer's type of varying sizes, and the calculation of the overall area of every illustration so that the two results, when put together, will exactly fill a set number of pages of a pre-determined size of paper.

In addition, important illustrations must be big, important text must be bold or be well spaced-out for easy reading; and where the text refers to an illustration, the two must be on the same page, or be adjacent. These and a host of other layout problems arise and mean much work and the passing of a considerable period of time. After this is the actual printing period, which may be several weeks.

The point of this digression is, of course, the fact that otherwise the sensible course would be to describe and photograph the product when it is finally completed, and then print the resulting information immediately. This is unfortunately impossible.

The preparation of technical publicity material must commence weeks before publication date and it must, therefore, keep step with the changes made as development work proceeds. As any such change

Only Strowger Ut



SWITCH AND BANK MOUNTING SPACE FOR EXPANSION

ALL FRAME WIRING INSTALLED AND JACK-ENDED AT FACTORY

SWITCH MOUNTING SPACE FOR EXPANSION

SPACE AVAILABLE FOR ADDITIONAL SWITCH SHELF

tomatic Equipment

Provides Such Flexibility!

Fundamentally, the Strowger Automatic system consists of small, easily-handled switch units, which can easily be slipped in or out of their jack mountings on the shelves.

This outstanding feature in basic design leads to a number of highly important advantages, some of which are shown in the accompanying illustration. These advantages become increasingly important as traffic conditions change and as the exchange expands. It is then that the true flexibility of the equipment is appreciated.

With Strowger Automatic equipment, additions and changes can be made quickly and simply by your own personnel — often merely by adding new switches and banks to existing vacant space on the shelf. Even when new "shelves" or "frames" are required, such expansion is easily and quickly accomplished, without interruption of service and without necessitating the costly rewiring of the existing equipment.

This feature of Strowger adaptability—unit construction—is one of the reasons Strowger equipment has been installed in practically every country of the world and has successfully met every conceivable variety of traffic condition. Let us tell you how it can make your operations more profitable in the years to come.

AUTOMATIC ELECTRIC

MAKERS OF TELEPHONE, SIGNALING AND COMMUNICATION APPARATUS
ELECTRICAL ENGINEERS, DESIGNERS AND CONSULTANTS

Distributors in U. S. and Possessions:
AMERICAN AUTOMATIC ELECTRIC SALES COMPANY, 1033 W. Van Buren St., Chicago, U. S. A.
Export Distributors: AUTOMATIC ELECTRIC SALES COMPANY, LIMITED

occurring, particularly in the final stages of the work, will often mean more photography, further "retouching," new cuts, alteration to type matter, and then revision of the layout to suit, it will be seen that the closest cooperation between the technical and advertising staffs is essential if long delays in the delivery of printed publicity matter are to be avoided.

In point of fact to issue literature after weeks or even months of careful work, and then to discover that it is obsolete on the first day that supplies arrive from the printer, may be a Gilbertian situation—one which has many of the elements of a farce and not a few of those of a tragedy—but it is one which is nevertheless within the actual experience of many firms engaged in the manufacture of highly-developed engineering products.

Publicity Matter Must Not Reveal Too Much to Competitors

In the matter of accurately descriptive publicity material another difficulty arises. It is often commercially undesirable to reveal to any great extent the manner in which equipment operates or its detailed construction; competitors sleep not, neither do they rest.

But technical customers do require to know—and often will not contemplate buying until they do know—for apart from the obvious disinclination to buy a pig in a poke, there are other involved questions such as power supply, type of mains, existing apparatus of a special nature, and the like, to be considered.

If initial interest is aroused by advertising, prospective customers can, of course, call for specifications or tenders to obtain further information. This causes yet another problem for the concern which is issuing advertising matter, for frequently a flood of inquiries results. If these are concrete inquiries, meaning real business, works production becomes an urgent question.

If delivery dates are not to be in the dim and distant future, plant and workshop reorganization may be necessary to meet the demand—and the demand may prove to be but a Barmecidian banquet, the result of interesting advertising material which does not tell enough. Valuable goodwill can also be lost if attempts to steer a safe middle course in the release of information, giving of delivery dates and the like, are misunderstood.

In contrast to this situation are dealings with non-technical customers buying a technical product, particularly one in everyday use. The apparently excellent selling story of technical perfection can have a boomerang effect.

Many sales managers have sad recollections of the prospect, who, while unscrewing his fountain pen ready for the dotted line, has seen just one more booklet. "By Jove," he says, "Is this what's inside it? Er . . . very complicated, isn't it?" And in spite of all one says, tomorrow he buys Blank's, because you "just push a button." It's simpler, safer and better, he thinks, but it works just like your own.

Prestige publicity has its own problems. Equipment bought by highly responsible bodies, particularly governments, corporations and the like, has undoubtedly the valuable stamp of official approval. But such bodies are frequently hydra-headed.

In other words, by the time the final committee has approved the expenditure and the order is placed, the story is yesterday's. It is sufficiently "half-known" to be robbed of interest to many people, while other contracts for similar work may yet have been lost for want of adequate mention in other directions. Yet it is fatal folly to refer in cold print to the job which every factory hand knows he will be working on next week, if he has not already finished his share of it.

Such mentions are dangerous, too, in other ways on occasion. Reference to a praiseworthy engineering achievement is valuable publicity, for it tells of a technically difficult job well done. Mention of such an installation, say, in Chile, may elicit pats on the back—and an order for a similar installation elsewhere.

But different climatic and other considerations mean a complete revision of the specifications, more experimental and development work and other uneconomic nuisances, terminating in loss of both goodwill and prestige if the order be refused.

Tact is also frequently called for, as an important overseas agent or useful sales contact will often press for mention of work carried out in his territory, or as a result of his sales efforts. Whilst purely local advertising is safe in such cases, it is rarely considered as sufficient. In most districts the really important trade journal has a widespread, and frequently an international, circulation, while as for literature—the birds of the air, we are told, carry seeds and are responsible for flowering "foreigners."

There are probably few concerns which have not in their time issued "strictly local" literature, and the birds have brought not flowers, but curses, home to roost. In the foregoing respect the position with regard to patents is often of paramount importance, and affects not only what is said, but when it is said. The latter circumstance, in fact, often governs the former. The patent executive is thus one more addition to the list of individuals who must be satisfied with the publicity material, and this list is usually very lengthy.

Time Lost in Submitting Proofs to Many Departments

This is necessary but unfortunate, for by the time the home sales manager, the overseas sales manager, the chief engineer, the patent executive, the works manager and possibly several others have given publicity material the serious consideration which it needs, much water has flowed under a number of department bridges.

This means loss of time, the more so because frequently one department is affected by the remarks of another, and it is, therefore, necessary to circulate proofs, manuscripts, etc., in rotation instead of allowing all to cogitate over separate proofs simultaneously.

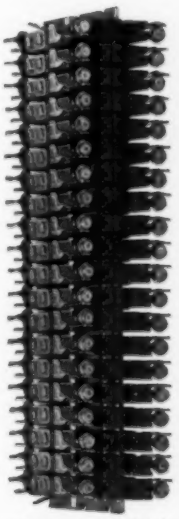
These problems, and others of which space will not permit a mention, may be summarized thus: Technical progress is like the building of a road to aid the onward march of mankind. Sometimes the construction of the road proceeds apace over smooth plains, and sometimes it clambers up a hillside or over a rocky stretch. But technical advertisements and literature are not advertising "puffs." They are a running commentary on the building of the road.

Boy of Today and Radio of Tomorrow

"As one who has been a participant in radio since its infancy, I can tell you that what lies ahead is far greater than what lies behind. The boy of today will find in the radio of tomorrow opportunities for achievement that we, who struggled as its pioneers, could hardly have dreamed to be possible."—David Sarnoff, president of Radio Corp. of America.

Cook No. 100 and No. 3800
CENTRAL OFFICE PROTECTORS

For cable termination and protection against high potentials and sneak currents.

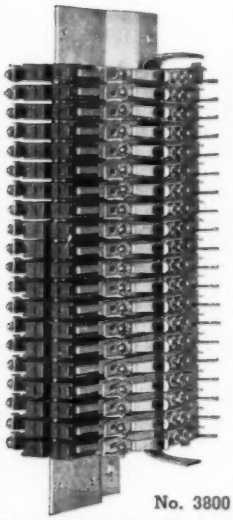


No. 100

10 pair sections 5½" high
20 pair sections 10½" high
21 pair sections 11" high
23 pair sections 12" high

OUTSTANDING FEATURES OF THE COOK PROTECTOR

- Opens switchboard circuit and grounds the outside line.
- Operates on alarm circuit.
- Provides for temporary disconnect.
- Self-soldering heat coils of low resistance, which can easily be reset without changing coil.
- Line connections on one side of protectors, switchboard connections on other side.
- Testing without removing heat coil.
- Correct design and traditional Cook quality.



No. 3800

20 pair sections 8⅝" high
21 pair sections 9" high
51 pair sections 20¼" high
101 pair sections 39" high

The No. 3800 Protector is designed for use in exchanges where protector height is important; therefore pairs are mounted on ⅜" centers. Unit dischargers are standard equipment on the No. 3800 and optional equipment on the No. 100. With either protector, a test plug is available for testing the outside line, heat coils and switchboard circuit. Both protectors are equipped with lightning arresters and heat coils.

TERMINAL AND PROTECTION EQUIPMENT

★ COOK ★

COOK ELECTRIC CO., 2700 SOUTHPORT AVE., CHICAGO

North Dakotans Discuss

Problems Created by Legislation

***PROBLEMS CREATED** for companies by legislation of recent years—such as the Wage-Hour Act, the unemployment act and REA—occupied the attention of North Dakota telephone men at the recent state convention. Speakers offered worthwhile suggestions. The annual meeting attracted a larger attendance than for many years*

INTEREST during the two-day convention of the North Dakota Telephone Association was centered on the problems which have been created for telephone companies by legislation of recent years, such as the Wage and Hour Act, unemployment act, and REA. The 33rd annual meeting was held May 17 and 18 in the Great Northern Hotel, Devils Lake, located in the north-central part of North Dakota.

Registration was larger than in the past few years. Association officers and regular attendants were especially pleased by the presence of representatives from some companies who had never before attended a convention of the association. The Central Electric & Telephone Co. was host and all local arrangements for the convention were capably handled by J. C. Crookham, district manager of the company.

G. B. Brown, manager of the Moore & Liberty Telephone Co., Enderlin, was re-elected president of the association. W. R. Williams, Northern States Power Co., Minot, was elected vice-president, and A. J. McInnes of the Northwestern Bell Telephone Co., Fargo, was elected secretary-treasurer to succeed A. T. Nicklawsky of Hillsboro.

Two changes were made in the board of directors. J. C. Crookham, Devils Lake, was elected to fill the unexpired term of C. O. Field, who was recently transferred to West Virginia, and George Rollofson, Starkweather, was elected to replace B. M. Burreson of Pekin. Two directors, A. T. Nicklawsky, Hillsboro, and W. R. Williams, Minot, whose terms expired, were re-elected.

Discussions on the first day covered the subjects of rural electrification, taxation, service from the operator's viewpoint and reports of the president and secretary-treasurer.

Enthusiastic about telephone work since first entering the field and active for many years in state association work in North Dakota, A. J. McINNES, of Fargo, was recently elected secretary-treasurer of the state organization. In the past he served as president and also as secretary.

On the second day there was an address by a member of the North Dakota Board of Railroad Commissioners, discussions on the operation of the state unemployment act, accounting for Class D telephone companies and what the national association has been doing in connection with the Wage and Hour Act.

President Stressed Need for State Association

President Brown, in his address on May 17, said: "This is the 33rd annual convention . . . a long time in the life of telephone people to have served continuously. Perhaps some of you can remember the time when our association was organized, and I imagine few of the organizers realized what a huge industry this was to become.

"Today, as never before, I believe the work of the association has been appreciated by its members. The necessity of organized activity in order to safeguard our industry has never been as great as it has been during the last six years. Some of the harmful legislation that has been passed in recent years has curtailed and handicapped us greatly; but for all the trouble this has caused, we cannot overlook the fact that we have never been so well-organized as at the present time.

Our present difficulties plainly show the necessity of our state association. It has been very active in directing and informing us concerning state and national legislation. I think our national association is to be particularly complimented in their efforts to secure relief for us from the Fair Labor Standards Act of 1938. This devastating piece of legislation, if enforced as interpreted by Administrator Andrews, would cause many of us to seek other lines of endeavor."

Secretary A. T. Nicklawsky reported the association in good condition with all bills paid and a comfortable balance in the bank. He said that the past year was a busy one for his office, with many inquiries relative to the Wage and Hour Act, taxes, etc.

Mr. Nicklawsky stated that the membership was about the same as last year although several companies had become members who had not been members for several years. He also said several new companies had been organized this year but that no new territory had been developed as these companies had purchased certain exchanges from existing telephone companies. These exchanges are all small and were taken over by the agents or employes with one or two exceptions.

"The cooperation of the smaller telephone companies has been good," said Secretary Nicklawsky in conclusion. "They were anxious for

wage and hour information that we were not in a position to give definitely.

"This has been a pretty good year for the association, and I am very much pleased to know that some of the small companies, which left the association some years ago, are getting on their feet again and taking out membership."

State Commission Protects Companies in REA Activities

R. W. Carlson, chief engineer of the North Dakota Board of Railroad Commissioners, led a discussion on rural electrification. In his opening remarks Mr. Carlson said: "Most of our work in connection with the telephone industry the last few years has been on rural electrification wherein power lines have paralleled the ground return lines of your telephone companies. The commission established a policy whereby the electric company is to furnish the material to metallicize the line and the telephone company to furnish the labor of installing it.

"We have had three different projects in the state. Although we had some difficulty with the first one, the other two have come along in fine shape, and I believe to the satisfaction of the telephone companies."

A spirited discussion followed, participated in by a large number of the delegates indicating the intense interest there is in this subject. Mr. Carlson made it clear the commission had no thought of retreating from its established policy.

Taxes Have Become Serious Problem in Recent Years

Following this discussion J. M. Cathcart, secretary of the North Dakota Taxpayers' Association, gave a fine and instructive talk on taxes and showed by charts the upward trend of taxes during the last few years. Taxes, Mr. Cathcart said, are levied regardless of the ability of the people to pay and cited many instances where the counties levied far beyond the total assessment value of the property in the counties. This brought these counties to the verge of bankruptcy, it was stated.

Again referring to the chart, the speaker showed that the total property tax in the state was $9,500,000. This had risen steadily and reached $30,250,000 in 1921. There was a fluctuation from 1921 to 1932 when an initiated measure was passed reducing the base of assessment from 75 per cent to 50 per cent, since which time there has been a saving of from $8,000,000 to $10,000,000 to the taxpayers.

The matter of taxes is one of great concern to us, Mr. Cathcart stated. It is of the greatest concern because that little balance swings the pendulum as to whether or not we are going to have anything left over from the work we do as business or professional men or farmers, so that we may live as we would reasonably like to live and educate our children as we would reasonably like to educate them — which oftentimes, through tax exactions these days, is almost impossible.

Mr. Cathcart suggested that the only way to cut taxes is to cut expenditures. This means cutting down our top-heavy state and county government, elimination of certain bureaus and commissions and have a government no greater than we can pay for. This is not an easy thing to do, he said, but if the state, counties and the taxpayers are to remain solvent it must be done.

The last speaker of the afternoon session was Stuart H. Kelley, traffic supervisor, Northwestern Bell Telephone Co., Fargo, who addressed the convention on the subject, "Service from the Operator's Viewpoint." It was very interesting and instructive and was enthusiastically received by the audience. Mr. Kelley's address will appear in a future issue of TELEPHONY.

At 6:30 p.m. the banquet and entertainment took place in the hotel's banquet room. Mayor Hocking, of Devils Lake, reversed the general order of things and welcomed the telephone people at the banquet meeting instead of at the opening of the convention. J. C. Crookham, district manager of the Central Electric & Telephone Co. made an appropriate response.

The audience was delightfully entertained by groups of girls from the State Deaf School at Devils Lake in tap-dancing numbers. The Northwestern Bell Telephone Co. showed two sound motion pictures entitled "Getting Together" and "A Hurricane's Challenge."

Utility Regulation from Telephone Viewpoint

When the sessions convened on Thursday morning, May 18, the first speaker introduced was Elmer W. Cart, Bismarck, president of the North Dakota Board of Railroad Commissioners. As a preface to his address, he announced the appointment of R. M. Carlson as the new chief engineer for the commission to succeed J. H. Wiley who capably held that position for eight years and recently accepted a position in private industry.

ECONOMIZE WITH

"Reliable"

BRIDGING CONNECTORS

Substantial saving effected in installation time and assurance of a trouble-free connection. A superior standard in solderless connectors.

Hinged mechanism at end of bolt makes nut integral part of unit, eliminating dropping.

Top view illustrates *"Reliable"* No. 109 W connector — correct copper to iron connection. Below *"Reliable"* No. 104 N connector for copper to copper.

Reliable ELECTRIC COMPANY

OVER 25 YEARS SERVICE TO THE UTILITIES

1345 CARROLL AVENUE • CHICAGO, ILLINOIS

In discussing "Utility Regulation," Mr. Cart stated that the most formidable problem facing the commission, business and the people of the state is the reduction in income which has existed for a good many years. He said that back in the 20's (which often are referred to as "the good old days") many persons and businesses were having difficulties, even with the cash income from agriculture averaging around $200,000,000 to $225,000,000 a year.

Since 1930 this income has averaged less than $100,000,000 a year including benefit payments, and Mr. Cart stated anyone could see the difficulties which this brings about in business, in the government and to the people as a whole.

Pointing to the difficult task of bringing the state income back to a higher level and mentioning the efforts of the present administration to bring this about, the speaker said: "Whether these things are going to change the picture in the future only time can tell. We recognize that you who are operating public utility enterprises in the towns of the state are confronted with serious difficulties and we of the commission, in our regulatory work, are having an equally difficult task along with you.

"You people feel, and rightly so, that you are entitled to a fair return on your investment; on the other hand the public feels it should have service at a price consistent with its income. Trying to balance the various factors and satisfy everybody in these days of low income is a real problem.

However, despite the discouraging conditions, there is much evidence that the people of North Dakota are a tough and hardy people. We average approximately one telephone for every 10 persons in the state and, according to our statistics, we have 74,980 telephones which speaks well for people as hard-pressed as we have been. But we should have more.

Convince Farmers the Telephone Will Save Money

"In my judgment, speaking as a farmer which I was before I came to the commission, the telephone was the most important thing I had on my farm. I lived 12 miles from town and it was my only means of immediate contact with neighbors or the outside world. For rural people the telephone is the most important public utility service they can have. It not only permits one to obtain assistance in a hurry but also is a means of saving time and money. Today we are too willing to jump into the car and drive many miles to do something that could be done by telephone for only a few cents.

Your job as telephone companies is to do all you can to convince the farmers that, even though it might press them at times to pay the $1.50 monthly bill, by having a telephone they could actually save money.

One of the big problems, which was brought rather forcibly to our attention this past winter, was the ruling that the Wage-Hour Act would apply to all telephone exchanges. We could immediately see what effect this would have on the small companies which are in a majority in this state, and quickly took the matter up with our congressional group at Washington.

A. T. NICKLAWSKY, of Hillsboro, retiring secretary-treasurer of the North Dakota association, has served in that capacity for several years and formerly was president of the organization.

Mr. Larkin of our commission, who is a member of the executive committee of the National Association of Railroad and Utilities Commissioners, also brought the matter to the attention of that body, which sent out communications to all the state commissions.

At present it appears that a fair measure of relief is to be given the smaller companies which will be their only salvation. If the act were enforced literally, it would mean closing from 60 to 70 per cent of the exchanges in this state because they could not carry the financial burden. On the other hand, I can see the necessity of trying to increase the income of the low-income group.

I am not condemning the act but merely present for your attention the necessity for having some organization in the state that can speak for all companies, which is what we did last winter."

In conclusion, Mr. Cart stated that he thought the telephone industry in North Dakota is to be commended for the work it has done in connection with the problems facing it and the customers which it serves. "We are all in the same boat. Our livelihood and well-being depend on the things produced in North Dakota, and we must work together."

At this point, A. J. McInnes, Fargo, added to Mr. Cart's remarks relative to the commission's efforts in connection with the Wage and Hour Act. Mr. Cart and Mr. Larkin did a great deal more than just get in touch with their Congressmen and Senators and the National Association of Railroad and Utilities Commissioners, he said. As far as he knew, the North Dakota Board of Railroad Commissioners was the first to officially intervene in the wage-and-hour matter with Administrator Andrews and furnished him considerable information.

Operation of the State Unemployment Act

The next speaker was Norman Todd, of Bismarck, who explained the operation and accomplishments of the North Dakota Unemployment Act. His interpretation of the law was very well presented.

"There have been so far a total of $2,275,000 paid into the unemployment trust fund for the benefit of workers in the state of North Dakota," stated Mr. Todd. "These funds have been contributed from about 1,100 liable employers. Of these employers around 84 per cent have been determined as subject to the law because they had eight or more employes during any 20-calendar weeks in a year since 1936.

"The other 16 per cent constitute employers who have elected coverage for their employes within the state, which means they have gone to the commission and requested permission to contribute to the fund so their workers may receive benefits if they become unemployed. This $2,275,000 represents 1⅛ per cent of payrolls of 1937 and 2.7 per cent of payrolls in 1938 and the first three months of 1939 up to date.

Since January 1, when claims were first able to be taken or filed in North Dakota, we have taken over 7,000 initial claims for benefits. That means that approximately 16 per cent of our estimated workers who are subject to the law have come in and filed claims for unemployment benefits. In addition, we have taken

over 38,000 continued claims for benefits."

Mr. Todd pointed out that "amendments to the law, which were passed by the 1939 legislature provide among other things that no worker would receive less than $5 if eligible at all and that workers must have received in wages at least 30 times their weekly benefit amount. Since January 25 when the issuance of checks was started, 32,000 at an average amount of $9.00 per check have been issued. Altogether, over $290,000 have been paid out and at the present time $1,973,000 are still available in the trust fund for the payment of future benefits."

In itemizing the rates at which the various industries of the state contribute to the fund, Mr. Todd said that 40 per cent is contributed by the wholesale and retail trade which is the largest source and that telephone companies contribute 3 per cent.

F. W. Vail, of Milnor, a former president and still an active member of the association, recounted interesting highlights of a recent visit in the South.

Telephone Accounting for Class D Companies

Getting back again to telephone matters, an enlightening discussion was given on "Class D Telephone Accounting" by A. V. Hartl, Bismarck, statistician for the North Dakota Board of Railroad Commissioners. At the beginning of his talk, Mr. Hartl passed among the audience a mimeographed paper containing the balance sheets of a misinformed telephone company and an informed telephone company. It graphically pictured a situation stated to be typical of a large number of reports received from Class D companies.

Mr. Hartl urged telephone companies to establish and keep their accounting on a firm basis so they will know what they are doing and where they are going. Stating that the companies which really needed this advice seldom attended telephone conventions, he recommended that those present, when talking to the companies which need help and are eager for information, tell them the things they should know.

"My remarks do not apply to you people who are here today," he said in closing, "because the people who have interest enough in their business and in the telephone industry to come to conventions submit proper reports. . . . When opportunities arise, if you will pass along such information as you have gained here and in the future, it is certain we will have more accurate information in the office of the board of railroad commissioners."

The final speaker on the program was R. A. Phillips, Sioux City, Iowa, vice-president of the Central Electric & Telephone Co. Intending to talk on a different subject, Mr. Phillips reported on what had been happening relative to the wage-hour law.

Commenting on the preceding speaker's discussion of telephone company accounting, Mr. Phillips pointed out what great difficulty the national association had in getting good evidence to support claims because of the inadequate accounting practices of many companies and inaccurate reports.

Commenting on the attitude of the men who constituted the wage and hour committee of the United States Independent Telephone Association, Mr. Phillips said there wasn't a man who was trying to avoid paying fair and proper wages. When the exemption figure of 1000 stations was suggested, it was because 1800 telephone exchanges had been studied and it was felt that at the 1000 figure, and under, they need the relief. At the 1000 point and over, they could pay the wages or there was some semblance of chance they could recapture the rates. Mr. Phillips further stated that he believed many employes recognized it would be impossible to get enough revenue from a small town to pay an operator 40 cents an hour for 24 hours.

In conclusion, Mr. Phillips told of the association's efforts to get an interpretation from Administrator Andrews as to the hours of work which has an important bearing on the effect of the act. He also said "We owe a debt of gratitude to the North Dakota Board of Railroad Commissioners for their interest and recommendations to Mr. Andrews on the matter."

Following a number of questions directed to Mr. Phillips regarding the act, the report of the resolutions committee was read and approved, the new officers of the association were announced and the convention was adjourned.

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Oklahoma Association to Continue District Meetings

The success of the district meeting plan of the Oklahoma Telephone Association in 1938 has prompted the association directors to plan similar meetings during 1939. H. W. Hubenthal, Oklahoma City, secretary of the Oklahoma association, has invited members to make suggestions as to places and dates for holding the meetings.

SANDS

TYPE 35 PROTECTED CABLE TERMINAL

A large-capacity, protected cable terminal of extra-strong, durable construction, having heavily galvanized hood. Each pair of protectors consists of two 5-ampere Type 17 wood fuses and two Type 2105 discharge blocks. Available in capacities of 11, 16 and 26 pairs, with or without cable stub. Write for further information on this and other Sands protective devices.

SANDS PROTECTION EQUIPMENT
is made by:

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Chicago

The Operators' Corner

By MAYME WORKMAN

Traffic Supervisor, The Illinois Telephone Association, Springfield, Ill.

PURPOSE and scope of "information" operating practices. Series No. 371

THE MAJORITY of telephone companies supply their subscribers with telephone directories annually or semi-annually in order that subscribers may look up the desired number. In addition, records are maintained in the central office so that telephone users may call for numbers of subscribers not listed in the current directory.

Information operating practices are designed primarily to render a comprehensive and satisfactory service to telephone users who require assistance in securing telephone numbers.

The work of the information operator differs from that of the local operator in that the communication between this operator and the customer is more of a conversational than an order-giving nature. The customer states what he wants, the information operator may request more details, the customer may supply them, and when the search has been completed, the information operator gives the conclusion of her discussion with the customer.

Information operators have a great opportunity to personalize the service and to demonstrate the company's desire and willingness to be helpful. While we have some prescribed phrases for handling information calls, in many cases the operator finds it necessary to use her own choice of words. In this respect she should use good English but should not permit her manner to become stilted or unnaturally formal.

As in local or toll operating, the information operator should cultivate a pleasing tone of voice, expressing personal interest and a willingness to be helpful. The information operator has occasion to use her voice in a number of different ways to express her attitude. Therefore, she should study her voice carefully and develop its flexibility. For example, if the desired listing is not found, her voice should express regret at having been unable to help the customer.

We should always remember our telephone slogan — "The Message Must go Through"—and do everything within reason to exemplify it.

It frequently happens that the calling party supplies a listing materially different from the correct listing and the information operator is sure of the desired number. The proper manner of handling a call of this nature is to give the number, preceded by a brief qualifying statement as to how it is listed if it appears that this would aid the customer to find it himself in the future. For example:

On a request for the weather bureau, you might say, "That's listed under the United States Government. The number is 3189." Or, on a request for the clerk of the municipal court, you might say, "That is taken by the City Hall, Main 3400."

In handling telephone calls of any nature, every effort should be made to reach the desired party. While it is our desire and we do advocate the use of standard phraseology, we should not hesitate to deviate from this practice and choose our own words when a condition necessitates this action.

Questions from Illinois Operators

1. In giving a subscriber the intercepting operator, should you say "Thank, you" before connecting them?
2. What phrase is used when the called station is slow in answering when voluntary supervision is given?
3. On a station-to-station collect call when you have to hold the line waiting for the O.K., is the elapsed time three minutes for holding the circuit before the call is changed to person-to-person?
4. On a station-to-station call which takes the special collect 25-cent rate when made collect, if the party who answers refuses the charge, does the call remain a station call or does it take the corresponding person rate?
5. When a subscriber calls information and is unable to supply some of the necessary details, do we remember our telephone slogan, "The Message Must go Through," and make all possible effort to supply the number?

The answers to these traffic questions are given on page 29.

Lincoln (Neb.) T. & T. Co. Sales Drive Gets Results

The spring business drive of the Lincoln (Neb.) Telephone & Telegraph Co. resulted in 1,344 station sales, or 265 per cent of the company's quota, and a net gain of 250 stations. Total sales, including 1,212 miscellaneous items, were 2,556. The total number of interviews was 21,598, an average of 18.7 per employe. H. F. McCulla, general commercial superintendent of the Lincoln company, says that in addition to generating more interviews, more business and a greater net gain than either of the last two sales drives, the results gave evidence that the section served is on its way back to normal.

The end of the spring drive also marked the passing from the campaign picture of the guinea pigs which had unwittingly energized employes in every area to efforts designed to avoid having to give a home to the "insects." As an example, it brought the Hastings area — lowest in the November contest—with a rush to the point where, in the contest just closed, it topped all other areas.

Formal presentation of the cup to the winners was made at a specially-called picnic. The guinea pigs passed into the permanent possession of Area Manager Vern Campbell of David City. A new "disgrace symbol" is to be sprung in the next campaign. As successful stimulants for lagging areas and as rally-points for wholesome humor, the pigs earned a page in the memory book of Mr. McCulla.

A Deserved Tribute

In the final report to Congress of the Federal Communications Commission covering its investigation of the Bell System the following paragraph is found:

"Many of the most important advances in the development of telephone apparatus and equipment in the past have been accomplished by Independent manufacturers, and the field for productive application of inventive genius should be made as broad as possible."

In the rush and hurry of every-day business life, too often recognition of worth-while achievements is neglected. It is gratifying to record this deserved tribute to Independent telephone manufacturers from a government commission that has studied the subject exhaustively.

Financial News and Data

Lincoln (Neb.) T. & T. Co. Shows Four Months' Profit

The report of the Lincoln Telephone & Telegraph Co., Lincoln, Neb., shows total earnings of $869,433 for the first four months of 1939, a decrease of $3,179 from the 1938 earnings for the same period. Exchange revenues amounted to $617,632, an increase of $1,339. Toll revenues decreased $5,195 to $202,784.

Telephone expenses amounted to $692,689 a decrease of $3,077. Net telephone earnings of $176,744 for the period were nearly the same as the 1938 results. Net earnings from all sources were $199,376. Interest payments of $54,056 were practically the same, leaving a net profit of $145,320. Dividends paid were $154,203.

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Revenues Increased for First Four Months of 1939

The report of the Northwestern Bell Telephone Co. to the Nebraska State Railway Commission showed total revenues of $11,340,652 for the first four months of 1939, an increase of $415,251 over the same period of 1938.

Exchange revenues amounted to $7,966,519, an increase of $256,509. Toll revenues were $2,785,940, an increase of $127,938. Telephone expenses amounted to $9,275,373, a decrease of $30,333. Telephone earnings of $2,065,279 showed an increase of $445,584.

Total income for the four-months' period was $2,275,466, an increase of $409,136 over the same period of 1938. Interest payments amounting to $394,488 decreased $6,044 leaving a net profit of $1,880,978, an increase of $415,080. Dividends paid were $1,666,667 leaving $214,311 to be transferred to the surplus account. Earnings on common stock were $5.64 compared to $4.40 in 1938. Stations in service increased from 645,281 in 1938 to 663,804.

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Rochester (N.Y.) Telephone Corp. Net Earnings Decrease

Operating revenues of the Rochester Telephone Corp., Rochester, N. Y., for 1938 were $5,154,282.86, an increase of $148,461.61, or 3 per cent, over 1937. The revenues have been steadily increasing since January, 1934. At the end of 1938 the revenue level was approximately equal to revenue for the period ending October, 1929. Practically all increased revenues came from local service and miscellaneous revenues; the increase in toll service revenues was almost negligible.

Operating expenses, except taxes, showed a net increase of about $65,700, or 1.8 per cent, over 1937. Including taxes, the increase was $158,200, or 3.8 per cent. Taxes for 1938 showed an increase of almost 17 per cent, and required practically one-eighth of the corporation's revenues.

The increase in taxes from 1936 to 1938 was in excess of $241,000. During the same period operating revenues increased about $389,700. In comparison, taxes of the corporation have increased 60.5 per cent while revenues have increased only 8.2 per cent.

Net earnings available for interest and dividends in 1938 were $824,052.48 and represented a decrease of $12,233.22 from 1937 earnings. Interest on funded debt was earned 3.67 times and interest charges as a whole were earned 2.79 times. Dividends on first preferred stock were earned 3.57 times while dividends as a whole were earned 1.34 times.

During 1938 the corporation had a net increase of 2,069 telephones. At the end of the year there were 106,558 company-owned telephones and 1,662 connecting telephones served by the system.

Gross additions to plant and equipment during 1938 amounted to $1,764,198. Retirements of plants and equipment amounted to $1,077,188. At the end of the year the investment in plant per telephone including general equipment, was $208.06, compared with $205.61 at the end of 1937.

In addition to giving the complete figures on the 1938 operations, the annual report also included illustrations showing additions and improvements made during the year. They pictured improvements made to open-wire lines, the interior of the new central office at Dansville, and the wire chief's test panel and power and ringing control equipment at Wayland.

The officers and staff of the company include: Fred C. Goodwin, chairman of the board; John P. Boylan, president and general manager; Charles

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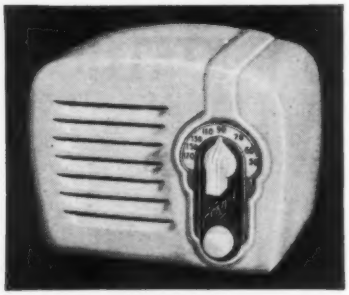

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▼ ▼

Southwestern Bell Shows Gains and Losses in 1938

The lower level of business in the territory of the Southwestern Bell Telephone Co. in 1938, brought with it declines in the telephone business. One important indicator, the net gain in telephones, fell from 77,484 in 1937 to 45,038 in 1938. Likewise, the total of 48,846,053 long distance calls made during 1938 represented a substantial decline from the number handled the previous year.

Despite the lower volume of long distance business in 1938, the increase in the number of telephones in service resulted in an improvement of $1,453,712 in gross operating revenues, the total for the year being $87,863,254. Total operating expenses increased from $55,670,954 in 1937 to $56,687,938 in 1938. The increase in operating expenses was due principally to payroll increases and to taxes which increased from $10,751,381 to $11,722,712.

As the increase in payroll and taxes more than offset the increased revenues, net earnings available for interest and dividends declined from $20,089,301 in 1937 to $19,811,562 in 1938.

The year ended with 1,484,627 company-owned telephones in service, compared with 1,399,748 on December 31, 1937. The 1938 figure, however, includes 39,715 telephones of two wholly-owned subsidiaries (United Telephone Co. of Abilene, Kans., and Scandia Telephone Co. of Scandia, Kans.) whose operations were taken over by the Southwestern Bell at the end of 1938.

The 1938 taxes were the highest in the history of the company. They represented an average of $32,100 for every calendar day of the year, or the equivalent of $8.26 for every telephone in service during the year, compared with $5.39 for every telephone ten years ago.

Earnings of employes continued to rise during 1938. With few exceptions, the maximum work week in the company was 40 hours. Because of wage improvements, substantially all employes are receiving a higher wage for the present work week than for the longer work week in effect in 1929. During 1938, $35,189,706 were paid in salaries.

The company's annual report, made for the directors by President A. C. Stannard, stated that practically all phases of the service rendered by the the company showed improvement during 1938. Measurements indicated that the quality was the highest in the history of the company. The speed and accuracy with which telephone calls were handled were the best on record.

Local calls, on the average, were completed in 20 seconds, and only one out of 300 was affected by operating errors. More than 91 per cent of the long distance calls went through while the customer remained at the telephone. The average length of time required to complete all long distance calls was only 1½ minutes.

In reviewing the improvements in service, the report said: "The reason the United States has the best telephone service in the world is due in no small part to the fact that the management and supervision of the business in all its levels is in the hands of experienced people: men and women who have come up from the bottom.

"This process is a continuing one; for those who will manage the business tomorrow are today at work in the ranks of the organization. To convey some idea of the Southwestern Bell's seasoned organization, of the 24,867 employes on the payrolls, 14,173 have had 10 years or more telephone experience; 3,282 have been in the business 20 years or more; and 44 for 40 years or more."

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Mankato (Minn.) Company Reports Increased Earnings

Net earnings of the Mankato Citizens' Telephone Co., Mankato, Minn., increased from $41,883.62 in 1937 to $42,751.72 in 1938. The gross revenue for 1938 amounted to $198,342.53, an increase of $9,403.70 or 5 per cent over the year 1937.

The steady increase in gross income of the company is accounted for by the growth in subscriber's telephones in the six communities served. Toll business, reflecting the depressed condition of business, showed a decrease for the year compared with 1937. On December 31, 1938, the company had 6,732 company-owned telephones in service and 497 farmer-owned connecting telephones. Compared with 1930, the peak year, the company has recovered its station losses of the depression era and gained 562 stations.

The total cost of operations for 1938 amounted to $155,590.81, an increase

Answers to Traffic Questions on Page 26

1. Yes.
2. If the called party does not answer within 30 seconds after the operator's acknowledgment of the call, say to the calling party, "I am trying to get them," and continue ringing.
3. The time allowance for holding the toll circuit is three minutes on a direct and five minutes on a built-up circuit.
4. If the charge is not accepted and the calling party cancels the call, it is subject to the person-to-person rate.
5. Please refer to preface.

of 5.8 per cent over 1937. The increase in operating costs was due to an increase in maintenance expense caused by increased wages, the cost of relocating pole lines for highway improvements, and an increase in taxes.

Taxes for 1938 represented approximately 15 per cent of the gross income or almost 50 per cent of the net earnings. The annual report of the directors to the stockholders called attention to the increased taxes by stating: "It is significant that when the present rates for service were placed in effect in 1926, the total taxes amounted to approximately $2 per subscriber or $1.68 per telephone. In 1938 they represented approximately $4.25 per telephone or approximately $5.70 per subscriber for the year. Since 1926 taxes have increased 180 per cent."

The annual report shows that the company has a total of $932,821.85 invested in telephone plant equipment.

H. A. Patterson is president of the company; W. D. Willard, secretary and treasurer; and P. M. Ferguson, general manager. In its 41st year, the company is said to be the largest locally-owned and managed telephone company in the Northwest.

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California Associated 1938 Earnings Increase

At the beginning of 1938 the number of telephones served by the Associated Telephone Co., Ltd., Santa Monica, Calif., was 95,744. During that year every exchange of the company except Lake Arrowhead, experienced a net gain, so that December 31, 1938, the company had 102,605 telephones in service.

Total operating revenues for 1938 were $3,843,830.38, against $3,577,-302.49 in 1937. Operating expenses and taxes amounted to $2,812,279.68, compared with $2,625,591.50 for 1937.

Operating expenses exclusive of depreciation and taxes, increased only 2 per cent. The amount provided for depreciation during 1938 was 13 per cent higher than the 1937 figure. Contributing to the larger amount of depreciation provided on the company's records was an increase in the rate on telephone apparatus which was necessary because of the greater degree of obsolescence attached to desk telephones by reason of the movement of regulatory bodies toward abolition of the extra charge for handsets.

Taxes were 14 per cent higher in 1938 than in 1937. Total taxes charged to income for 1938 represented 16 per cent of gross revenue or $6.10 for each telephone in service, as compared with the 1937 figures of 15 per cent and $5.83 respectively.

Net earnings for 1938 were $1,043,-745.46, an increase of $82,396.50 over 1937. Interest and other deductions, amounting to $421,917.37, reduced the net income to $621,828.09, an increase of $49,651.17 over 1937.

The company entered the year 1938 with a total investment in telephone plant of $17,955,511 and ended the year with an investment of $19,359,-229, an increase of $1,403,718. The large increase was made necessary by the gain in telephone stations.

At the beginning of 1938 there were 914 persons in the employ of the company; and at the end of the year the number had increased to 960. Total payroll for the year was $1,545,627, as compared with $1,442,210 in 1937. The increase in payroll was due to added personnel and to wage increases.

The San Joaquin Associated Telephone Co., a wholly-owned subsidiary of the Associated Telephone Co., Ltd., gained 58 stations during 1938. Net income from this company's three exchanges increased from $15,532.02 for 1937 to $16,984.69 for 1938.

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Southern Bell's 1938 Earnings Increase

Net income of $10,180,317 is reported by the Southern Bell Telephone & Telegraph Co. for the year ended December 31, 1938, comparing with a net of $9,987,848 for 1937.

After dividend payments of $9,999,-920 on common stock, surplus for 1938 was $180,397. This compares with a deficit of $12,072 for 1937.

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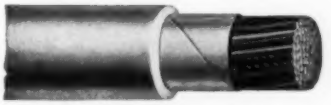

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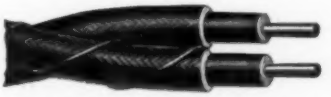

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Commission and Court Activities

Commissioner Walker Reappointed to FCC

On Monday, June 26, President Roosevelt nominated FCC Commissioner Paul A. Walker for another term on the commission. Mr. Walker was appointed July 1, 1934, when the commission was organized, for a five-year term. His renomination to the commission is for a full term of seven years.

FCC Gets Appropriation for Its Operation

A House committee has approved the $2,669,377 "urgent" deficiency appropriation bill which included $1,838,175 for operation of the Federal Communications Commission for the 1940 fiscal year. This is an increase of $93,175 over the current appropriation, but is $200,000 under President Roosevelt's recommendation.

Earlier, FCC Engineer Jett told the House subcommittee on appropriations that in five years the FCC would need at least $5,000,000 annually. He inferred that over $2,000,000 of it would be asked for regulation of the telephone industry, as outlined in its recent report on its investigation of the Bell System.

REA Chief Transferred to New Federal Agency

John M. Carmody of the REA on June 24 was nominated by President Roosevelt as head of the new Federal Works Agency, one of the posts created under the governmental reorganization plan.

As federal works administrator, Mr. Carmody will boss the Public Works Administration, the Works Progress Administration, the United States Housing Authority, the bureau of public roads of the Department of Agriculture, the public buildings branch of the Treasury and the building management branch of the national park service in the Department of Interior.

Mr. Carmody was named administrator of the Rural Electrification Administration on February 15, 1937. He succeeded Morris L. Cooke of Pennsylvania, who had been its acting head.

In May of 1937 he issued instructions that the REA would not share any expense of metallicizing grounded lines, made necessary by inductive interference from REA sponsored electric lines. It is hoped that his successor as REA head will modify or reverse the Carmody policy.

Arkansas Supreme Court on Inductive Interference Case

The Arkansas Supreme Court on June 5 ruled that the Arkansas Department of Public Utilities properly refused to condition its issuance of permits to rural electric cooperative corporations upon their paying for improvements to safeguard rural telephone lines against inductive interference caused by power lines paralleling certain types of telephone lines.

The court's decision on the right of the utilities commission to fix responsibility for telephone line improvements, necessitated because of inductive interference, grew out of an appeal of the commission from a Pulaski Circuit Court verdict (TELEPHONY of March 18, page 30) upholding R. O. McConnell, of Green Forest and other owners of Independent telephone systems in their contention the commission should make issuance of permits to rural electric cooperatives conditional upon their payment of costs of improvements to telephone lines to overcome the inductive interference.

In its decision reversing the lower court, the state supreme court said:

"What we do decide is that the department [of public utilities], by express language of the statute, is denied jurisdiction over the cooperatives in question other than a determination of whether public convenience and necessity will be served in the particular territory or area into which or through which the applicant proposes to operate."

Concerning the commission's power to decide disputes concerning rural cooperatives, the court said:

"We are of the opinion that such power of limitation relates to methods of construction and the quality and extent of service in relation to rates, etc., rather than to controversies between contending utility companies in respect to matters involving damages to their property. Determination of the former is legislative in its nature, while the latter is judicial."

Inference of the decision was that responsibility for payment for improvement to telephone lines necessitated by inductive interference should be determined by the courts, rather than the utilities commission.

Labor Board Finds Unfair Labor Practices

The Central Missouri Telephone Co., Warrensburg, Mo., was found guilty of unfair labor practices in connection with the organization of a union among its plant employes but was not required to reinstate four men discharged on December 27, 1937, or to pay any back wages, in the intermediate report made by Joseph N. Maguire, trial examiner for the National Labor Relations Board, who conducted a hearing in Warrensburg, March 27-31, 1939.

The company was allowed 10 days in which to file exceptions to the report and to request an appearance for argument before the NLRB.

Examiner Maguire, in summarizing his report of the hearing, recommended

that the company "cease and desist" from interfering, restraining or coercing its employes in the exercise of their right to self organization in the local union of International Brotherhood of Electrical Workers, or any other local organization, for the purpose of collective bargaining or other mutual aid or protection.

The report also recommended that the company, upon request, bargain collectively with the union as the exclusive representative of the plant employes in respect to rates of pay, wages, hours of employment and other conditions.

It was charged in the original complaint filed with the labor board through the union that four men were discharged because of union activities. The examiner's report recommended that one not be reinstated, that another's complaint be dismissed with prejudice and that the complaint of other two men be dismissed without prejudice.

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Wheat to Direct Washington State Rate Inquiry

Carl I. Wheat, of San Francisco, former FCC telephone rate counsel who aided in the final drafting of the commission's final telephone investigation report, was recently appointed counsel in charge of the $300,000 state-wide rate investigation being conducted by the Washington State Department of Public Service.

Mr. Wheat was summoned to Seattle and Olympia, Wash., for conferences with the state regulatory officials early in June and was engaged to conduct the telephone rate investigation. Lewis Hayner, a former FCC telephone investigation engineer is also on the Washington state telephone rate inquiry staff.

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Arkansas Company Seeks Court Aid in REA Case

Fred Northcross, owner of the Madison County Telephone Co., Huntsville, Ark., on June 14 filed a petition for an injunction against the Ozarks Rural Electric Corp., charging that the company's telephone service is being interfered with by the construction of lines to carry high voltage by the electric corporation on the telephone company's right-of-way. The poles and lines of the power line come in direct contact with the telephone lines, he charged.

The area concerned is east and north of Hindsville and between that town and Springdale. The petition names as defendants, in addition to the corporation, E. H. Looney, superintendent; Fritz Ziebarth, contractor, and D. N. Goff, superintendent in charge.

The case was taken direct to the court at Fayetteville as a result of the ruling, June 5, of the Arkansas Supreme Court to the effect that the Arkansas Department of Public Utilities has no authority over inductive interference damage cases between telephone companies and rural electric cooperatives.

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Committee Named for Telegraph Industry Probe

Chairman Wheeler [D., Mont.] of the senate interstate commerce committee named Senator Hill [D., Ala.] June 23 as chairman of a subcommittee to investigate the telegraph industry. Other members of the committee will be Senators Stewart [D., Tenn.], Tobey [R., N. H.], and White [R., Me.]

The Senate on June 19 passed the resolution authorizing the inquiry but cut the amount to cover it from $25,000 to $5,000.

▼ ▼

Company Ordered to Stop Anti-Union Activities

The National Labor Relations Board, on June 22, ordered the Commonwealth Telephone Co., Madison, Wis., to stop discouraging membership of its employes in the International Brotherhood of Electrical Workers (AFL local No. 378), or in any other labor organization. The Commonwealth company was also ordered to reinstate, with back pay, two employes alleged to have been discharged for union activities. In its order, the NLRB, however, did not report a finding which recognized the IBEW as the bargaining agency of the male workers at the Commonwealth exchange in Wausau, Wis.

The NLRB said that the evidence from the examiner's hearing revealed that during April, 1937, the company had interfered with the efforts of its men employes in Wausau to form a labor organization.

The board upheld the charges made against the company that officials had questioned employes about their union organization activities; had threatened them because of such activities; made anti-union statements to employes regarding their union activities; prevented the rendering of assistance of others to employes engaged in union activities; and attempted to dissuade and caution a strong union adherent about his engaging in organizational activities.

The board also stated from the evidence produced it was clear officials of the Commonwealth company, from the

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first organizational meeting held by its Wausau employes, had combatted the union's organizing efforts.

The Commonwealth Telephone Co., which operates exchanges in approximately 100 small cities in Wisconsin, was ordered by the NLRB to post "cease and desist" notices in its exchanges for a period of 60 days, and to notify within 10 days the board's regional director in Milwaukee of its compliance with the order.

▼ ▼

Judicial Jurisdiction for Oklahoma Supreme Court

An effort will be made at the next special or regular session of the Oklahoma legislature to enact state legislation which will make it possible for the state supreme court to exercise judicial jurisdiction as well as legislative jurisdiction.

At the last session of the Oklahoma legislature a bill to accomplish this purpose by providing speedy judicial review of rate orders of the Oklahoma Corporation Commission passed the Oklahoma House but died in the Senate.

At the present time the Oklahoma Supreme Court exercises legislative rather than judicial jurisdiction in reviewing telephone rate cases appealed from the state commission. The United States Supreme Court has held that a state supreme court must grant a judicial review in order to be the court of last resort in a utility rate case.

In Oklahoma an appeal may be taken from the state supreme court to a lower federal court in the state before going to the U. S. Supreme Court. It is the opinion of legal authorities in Oklahoma that if the state supreme court is given the right to exercise judicial powers it will become the final court of appeal in the state from rate orders of the corporation commission.

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Defrauds Company on Toll Overtime Charges

Accused of defrauding the New York Telephone Co. in a series of long distance calls, Joseph Arnstein of Brooklyn, N. Y., was recently arraigned in the Buffalo, N. Y., city court on the charge of petit larceny. He admitted that on three occasions he had defrauded the telephone company when telephoning his wife in Brooklyn.

Mr. Arnstein would deposit the coins necessary for a three-minute call. When notified that he was running overtime, he would tell the operator the coins would be deposited when the call was completed. The company charges, however, that when conversation was finished the receiver was left off the hook and the operator was unable to call back to inform him how much additional money should be deposited. During the interim the caller would leave the hotel.

Telephone company officials were on the watch for the man after the ruse had twice worked successfully.

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Summary of Commission Rulings and Hearings

Federal Communications Commission

June 16: Mountain States Telephone & Telegraph Co. given authority to supplement existing facilities between Tucson and Bisbee, and between Phoenix and Tucson, Ariz.

June 16: New Jersey Bell Telephone Co. given authority to supplement existing facilities between Penns Grove and Deepwater, N. J.

June 16: American Telephone & Telegraph Co. and Ohio Bell Telephone Co. given authority to supplement existing facilities between Columbus and Dayton, Ohio.

June 20: The commission, on its own motion, ordered that an investigation be instituted in the matter of radiotelephone service between ships on the Great Lakes and land radiotelephone stations provided by Donnelly Radio Telephone Co. and Lorain County Radio Corp., to be held July 24. The Lorain County Radio Corp.,

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American Telephone & Telegraph Co., Lorain Telephone Co., Illinois Bell Telephone Co., Northwestern Bell Telephone Co., Ohio Bell Telephone Co. and Wisconsin Telephone Co. were made respondents in this proceding.

June 20: M. R. Sullivan given authority under Sec. 212 of the Communications Act of 1934, to hold positions as first vice-president and director of Pacific Telephone & Telegraph Co. and first vice-president of Southern California Telephone Co. and Bell Telephone Co. of Nevada, in addition to the positions for which authority was heretofore granted.

June 20: F. J. Reagan given authority to hold position as director of Bell Telephone Co. of Nevada, in addition to the positions for which authority was heretofore granted.

June 20: Tracy J. Peycke given authority to hold positions as director and vice-president of the Dakota Central Telephone Co. in addition to positions for which authority has heretofore been granted.

Arkansas Department of Public Utilities

June 7: Approval asked of contracts whereby James Thompson of Waldron would purchase telephone exchanges at Charleston and Branch from the Western Arkansas Telephone Co. for $5,000 and exchanges at Belleville, Danville, Ola, Plainview, Hartford, Mansfield and Magazine from Southwestern Bell Telephone Co. for $7,000.

The commission also was asked to approve issuance of $4,000 in notes to apply on the $5,000 purchase price and $6,000 in notes to apply toward payment of the $7,000. Mr. Thompson agreed to pay each of the companies $1,000 cash. No date was set for hearing of the petitions.

June 7: Commission denied Southeast Arkansas Telephone & Power Co. authority to abandon its line between Star City and Cornersville. It ordered the company to file an offer for the sale of the line to the Cornersville Telephone Co.

June 15: Commission took under advisement application of Southwestern Bell Telephone Co. for authority to increase rates and change the type of its instruments at Springdale and to abolish "free service" between Springdale and Fayetteville.

The company, contending it operated at a 7.57 per cent loss during 1938, asked that dial-automatic instruments be substituted for magneto telephones and rates on one-party business and two-party residential telephones be increased. Maximum increase would be 50 cents per telephone per month. One-party residential line rates would not be affected.

The company also asked permission to substitute a 10-cents-per-call rate between Fayetteville and Springdale for free call service.

June 16: Southwestern States Telephone Co. granted authority to substitute dial-automatic instruments for magneto telephones at its Des Arc exchange.

Michigan Public Service Commission

June 8: Approval given to petition of Michigan Bell Telephone Co. asking for permission to sever service of subscribers who use profane or obscene language over a telephone. Commissioner Gilber T. Shilson said the company had a rule to that effect for some years but had never obtained commission sanction of it.

Missouri Public Service Commission

June 6: Southwestern Bell Telephone Co. filed voluntary tariff, providing for the elimination of the 15-cent monthly charge for handsets, effective July 1. The charge at present is collected for 12 months. It is estimated the removal of the charge will effect a reduction of $95,000 yearly in the company's revenues.

Nebraska State Railway Commission

June 21: Application filed by Farmers' Telephone Co. of Dodge County, with headquarters at North Bend, asking for authority to offer service from one additional exchange to subscribers at all exchanges upon payment of 50 cents per month.

New York Public Service Commission

June 26: Hearing in New York City on complaint of Central Station Signals, Inc., against New York Telephone Co.

June 29: Hearing in New York City on complaint of Utilities Consultants, Inc., against New York Telephone Co., as to certain of its collection practices.

Ohio Public Utilities Commission

June 20: Secretary certified report to mayor of Richwood and to the counsel of Ohio Associated Telephone Co., on the application of the company to revise its rates as follows:

Business independent, $3.00 to $3.50; business rural, $2.50 to $2.75;

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T. M. Partridge Lumber Co., Minneapolis, Minn.—Northern White—Western Red Cedar Poles. Plain or butt-treated.

Valentine Clark Corporation, 2516 Doswell Ave., St. Paul, Minn.—Finishd Cedar Poles. Plain or butt-treated.

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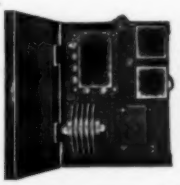

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Kellogg No. 18 heavy duty repeating coils @.....	5.00
Kellogg No. 11 or No. 12 Grabaphones with 4 Cond. cord for wall sets @....	3.50
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POSITION WANTED: Twenty years' experience Plant and Central Office maintenance, manual and automatic. Willing to start at reasonable salary in any locality. Address 8791, care of TELEPHONY.

POSITION WANTED: Manager of telephone company, by one who can guarantee results. Address 8783, care of TELEPHONY.

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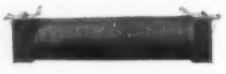

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BUCKEYE TELEPHONE and SUPPLY COMPANY
COLUMBUS, OHIO

residence independent, $2.00 to $2.25; residence four-party, $1.50 to $1.75.

Where the company submitted a base rate of $86,671.80 as of July 15, 1937, the commission's engineers recommended $82,339.26 as of March 31, 1939. The audit concludes with a finding that upon this base the present rates produced a return equivalent to 1.48 per cent and the new rates would produce a return equivalent to 2.32 per cent.

June 20: Commission secretary filed certified report on application of Ohio Associated Telephone Co. to revise its schedule at La Rue as follows:

Business independent, $3.50; business rural, $3.00 to $2.75; residence independent, $2.00 to $2.25; residence four-party, $1.75, no change; residence rural, $1.75, no change.

The company offered a base rate of $77,228.70 as of July 15, 1937, and the commission's engineers recommended $77,342 as of April 30, 1939, upon which the audit shows the present tariff produces a deficit of 2.29 per cent and the new schedule will reduce this to 2.11 per cent.

June 20: The secretary certified to mayor of Lowellville and to Ohio Bell Telephone Co. a report on application of the company, in connection with its program of converting its plant from magneto to common battery dial-automatic operation and to establish in the Lowellville exchange, in consideration of giving the subscribers universal Youngstown service, its prevailing Youngstown rate tariff.

The report stated that practically all of the subscribers have agreed to the change.

The new exchange will be divided into a base rate area where the schedule will begin with business independent line at $10; residence independent, $3.75, and zone rate area where the rentals for these services will be $11.75 and $3.59, with a business message rate of $5.50 and $7.25, respectively, entitling subscribers to 90 messages per month.

Tennessee Railroad & Public Utilities Commission

July 6: Hearing in Nashville on commission's order of June 13 that Collierville Telephone Co. show cause why improved service should not be furnished subscribers served by the Germantown exchange and why service desired by the subscribers had not been furnished. The order was the result of a petition of the Germantown civic club which is seeking Memphis exchange service for subscribers desiring such service and local switchboard service for the other subscribers.

Wisconsin Public Service Commission

June 27: Hearing in Lancaster on alleged failure of Farmers Telephone Co., Lancaster, to extend service to Ora L. Caley.

June 28: Further hearing in Madison on application of Commonwealth Telephone Co. for authority to revise telephone rates and to install dial-automatic service at its Dodgeville exchange.

June 29: Hearing in Neillsville on application of Community Telephone Co. of Wisconsin for authority to abandon its Humbird exchange and furnish service to subscribers through its exchanges at Alma Center and Fairchild.